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Placenta Praevia—A Cause of Early and Late Abortion

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PLACENTA PRAEVIA can and does cause severe bleeding in the first and second trimesters as well as in the third trimester of pregnancy. This condition is a recognized cause of abortion. Incidence is hard to judge in this early group. Schmitz and associates,¹ in a recent paper from their hospital service, quoted a 7 per cent incidence before the thirty-first week. Eadie and Randall² quote 12.9 per cent before the twenty-eighth week in their series. A very recent and excellent critical appraisal by Reich,³ based on a thirty-five-year study at Bellevue Hospital, reviewed a total of 69,891 deliveries with 310 cases of placenta praevia or 316 infants. Incidence of placenta praevia was 0.44 per cent. Total number of babies in this tremendous study under 3 lb. and less than 28 weeks was 29 or an incidence of 8.9 per cent. The average of the combined figures of Schmitz,¹ Eadie and Randall,² and Reich³ gives an incidence of 9.6 per cent. Total incidence of fetal death for all 3 series was 100 per cent. For all practical purposes, this percentage represents a very solid 10 per cent of all placenta praevia that, in the first 2 trimesters of pregnancy, can present important and serious complications both per se and from the wrong type of clinical approach. Too often these cases

of placenta praevia are called "just another abortion" and the patient is permitted to bleed on and on, either internally into the uterus, or externally, or both.

The work of Johnson^{4,5} and Macafee⁶ rather successfully disputed Jaggard's doctrine that "there is no expectant treatment for placenta praevia." Their method of conservative handling of placenta praevia has definitely aided fetal salvage. On Macafee's regime, fetal mortality dropped from about 37 to 23.5 per cent and, incidentally, maternal mortality dropped from 5 to 0.57 per cent. At first this was very good indeed, but doubts and cautions have now filtered into the literature. One of Johnson's own residents presented an authentic case of massive, almost fatal hemorrhage after an absolutely conservative regime had been followed. Reich³ reported 4 patients with very massive hemorrhages under the expectant plan of treatment. The obvious common sense conclusion is that the conduct of placenta praevia cases must be individualized. No magic formula replaces clinical judgment. The keynote is early suspicion, early recognition, and, above all, a method of treatment that is more than merely hopeful and expectant, when definite clinical aspects of placenta praevia are encountered, regardless of the stage of gestation.

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The 3 factors that appear to be most important are: (1) multiparity, (2) the presence of atrophic changes in the endometrium, and (3) embryology. On the basis of 30,796 labors, Doranth,⁷ in considering multiparity, found a 0.17 per cent incidence of placenta praevia in primigravidae, and in multigravidae, 5 or more had a 5.51 per cent incidence. The percentage of placenta praevia is increased not only by the number of children, but also by the rapidity with which the labors followed one another. Strassman⁸ found that the average age was 32.9 years, and the average number of labors was 6.38. Stander⁹ reported that 80 multiparous women with placenta praevia each had an average of 4.2 children during the ten years after the first delivery.

The second factor is reasoned as follows: defective vascularization of the decidua is the result of inflammatory or atrophic changes. Such atrophy causes a limitation of decidual vascularization so that the placenta is spread wide and thin. Thus, this type of placentation disposes toward either incomplete or complete covering of the internal os. The work of Hughes and associates¹⁰ on the glycogen content of the endometrium, supports the concept of Strassman⁸ and Eastman,¹¹ that should the endometrium show inflammatory or atrophic changes when the ovum is at the blastomere stage, placenta praevia could more easily develop than when there has been no previous endometrial pathology. Javert and associates⁹ noted a high incidence of placenta praevia in habitual abortion patients. This same complication was noted by Stander,⁹ who described 2 pregnant uteri removed in the first trimester of pregnancy: one uterus showed central placenta praevia and the other, marginal placenta praevia.

The third possible factor is embryologic: Eastman¹¹ concluded that placenta praevia probably results either "from the primary implantation in the lower portion of the uterus, associated with such extensive cleavage of the decidua vera that extension of the placenta to the region of the internal os is facilitated, or that it results from the development of part of the placenta upon the internal surface of the decidua capsularis." Hertig and Livingston¹² discovered that a low implantation of the placenta accounted for 5.6 per cent of 1,000 cases of abortion studied embryologically and pathologically. A high incidence of placenta praevia occurred in the abortions of multiparae. They concluded that the cause of placenta praevia "must lie somewhere in the maternal realm rather than in the ovular." Rhenter and Pigeaud¹³ believe 15 per

cent of spontaneous abortions are caused by abnormal placental insertions. Tissier¹⁴ noted the same.

There is, then, no clear and well-defined etiology of placenta praevia, but probably all of the factors listed are present in various combinations. The first 2 points are strikingly represented in the following case, while the third, or embryologic factor, is purely conjectural.

CASE HISTORY

A 35-year-old gravida V, para IV was admitted to the hospital because of brownish vaginal staining associated with mild uterine contractions. Her gestation period was estimated at fourteen weeks.

Family history was noncontributory, but past history revealed much medical illness and several operations. She had had the usual childhood diseases; scarlet fever was later complicated by acute glomerulonephritis; no sequelae have occurred to date. She suffered from acute rheumatic fever in 1935. Tonsillectomy and adenoidectomy were done later that year. Shortly thereafter, an attack of chorea occurred but has not recurred. In 1943, a moderately severe upper respiratory infection developed; nonhemolytic streptococci were isolated from nasopharyngeal cultures; response to sulfadiazine was good. Gallbladder symptoms developed in 1951, and cholecystectomy was subsequently performed. Pathologic diagnoses were chronic cholecystitis and cholelithiasis.

The patient was married in June 1941. She first became pregnant in 1945, and thereafter children were spaced about one year apart. All pregnancies, labor, and puerperia were essentially negative. In August 1952, dilatation and curettage were done for menorrhagia; microscopic examination showed secretory endometrium.

Present pregnancy: Last menstrual period was on March 14, 1953. Estimated date of confinement was December 21, 1953. Vaginal staining began at about ten weeks of gestation and became worse about July 8. Large doses of stilbestrol were started as well as bed rest, but without avail, and mild bleeding continued. She was admitted to the hospital July 13. Therapy similar to that she received at home was continued; cramps disappeared; uterus was of normal size for this stage of pregnancy, which was approximately fourteen weeks. There was no clinical evidence of premature separation. On the morning of July 16, the patient passed about 200 cc. of bright red blood from the vagina. This bleeding was associated with slight discomfort over the lower portion of the uterus. There was no spasm or rigidity of the lower abdomen.

The patient was typed, crossmatched, and taken to the operating room where, under a double setup, vaginal examination was carried out. The lower uterine segment was palpated, and placental tissue was palpated through a thin and well-defined lower uterine segment. The cervix was, however, not effaced and was undilated. Speculum examination was not performed. Impression was that of central placenta praevia associated with a fourteen to sixteen weeks' intrauterine pregnancy. Abdominal hysterotomy was elected as the mode of delivery and, under gas-oxygen ether anesthesia, a miniature classical cesarean section was done. Approximately 500 cc. of clotted blood was in the uterus, and the placenta was found over the internal os. The placenta was quite thin and covered a wide circumference. The lower uterine segment was extremely vascular and bled profusely.

Examination of the placental bed was difficult because of the classical incision, and no single area or sinus could be identified. The bleeding from the many large sinuses of the uterine wound was controlled by clamping with sponge sticks. The placental bed continued to bleed profusely. This was controlled by insertion of a tight 4-yard pack of 4-in. gauze. Three running layers of catgut sutures were placed, plus individual figure-eight sutures as needed. The patient lost about 800 cc. of blood and received 1,000 cc. of blood on the operating table. She was returned to the operating room sixty hours after surgery, and, under sodium pentothal oxygen anesthesia, the cervix was inspected. It was dilated about 3 cm. and 60 per cent effaced. A portion of the intrauterine pack could be easily grasped and was entirely removed except for the terminal 6 to 10 in. This was apparently held by a suture which inadvertently held down a portion of the gauze pack. She was allowed to go home on her eighth postoperative day, afebrile and in good condition. She was instructed to return in about a week. She did not return, however, for approximately twenty-one days and then showed evidence of an endometrial infection with both uterine and parametrial tenderness. The remainder of the pack could be seen in the cervix and was easily removed with a sponge stick. Its removal was followed by a foul smelling, whitish-grey discharge from the uterine cavity. She was hospitalized and placed on heavy combined penicillin, streptomycin, and dihydrostreptomycin therapy. She was given one 500 cc. blood transfusion and, later, hot water douches. Temperature remained elevated in spite of a pronounced decrease of objective and subjective findings to therapy. An abscess finally became manifest at the lower pole of the incision. This was opened and drained of a moderate amount of thick pus. Temperature returned to normal. A pelvic examination was essentially negative. She was allowed to go home on the tenth hospital day and was in good condition. Only a small draining area at the lower pole of incision remained. Follow-up examination two weeks later was negative.

THERAPY

Perhaps many of the abortions caused or complicated by placenta praevia are never seen, because the patient begins to bleed, has forceful uterine contractions, and then rapidly expels the fetus before the exact etiology of bleeding is recognized. However, there are cases of first and second trimester bleeding in which the hemorrhage is brisk and constant and in which there may or may not be evidence of active labor. Diagnosis is imperative. Differential diagnosis may be difficult, especially in advanced ectopic pregnancies of the cornual or abdominal type.

Sterile vaginal examination under a double setup procedure in the operating room is mandatory, with a quantity of blood on hand. The lower uterine segment is carefully palpated. The "ripeness" of the cervix is important. Has effacement occurred at all? Is the cervix dilated at all? How will the particular case be classified? Where does it fit in the classification of placenta praevia? Certainly the very early type of placenta praevia cannot be tagged as specifi-

cally as the kind that becomes symptomatic later. The marginal group, associated with uterine contractions and a reasonable and negotiable degree of cervical dilatation and effacement, may be treated by rupturing the membranes and applying a Willett clamp. This treatment is definitely restricted to the marginal type of placenta praevia. Vaginal delivery is scarcely ever indicated in the higher percentage types of partial placenta praevia, that is, the 40 to 50 or more per cent type, regardless of parity, unless labor appears to be progressing rapidly without excessive bleeding as evidenced by the status of the cervix and lower uterine segment. Vaginal delivery is never indicated in the total type of placenta praevia.

The use of a bag is obsolete and is of no value in modern obstetrics, with or without antibiotics. Braxton-Hicks' version is also obsolete, because of the risk involving complications of a torn cervix, possible rupture of the uterus, and so forth. In the occasional case, when a foot appears in the vagina, bleeding may be controlled by one-half a pound or so of gentle traction applied over a pulley at the foot of the bed. This therapy is all right if the bleeding is not heavy and labor progresses rapidly. The cervix and uterus may be torn badly, however, if gentleness is not used, since the tissue is so friable.

Rhenter and Pigcaud¹³ reported several cases of abortion with the diagnosis of placenta praevia made prior to delivery. They stress the fact that, in both cases, bleeding was profuse and their patients nearly lost their lives. Prompt and rapid delivery was stressed. Ronville and Madon¹⁵ cited a case that bled constantly from the first month and finally aborted, placenta first, in her sixteenth week. Progressive exsanguination of the patient can occur in this type of "watch and hope" therapy. The number of cases in this group that have not been reported in the literature must be very great.

ABDOMINAL ROUTE OF MANAGEMENT

Abdominal delivery is usually indicated in (1) marginal placenta praevia without labor or dilatation and (2) in the partial or total type. Delivery from below carries a great risk of cervical and lower uterine segment laceration. The placental site is extremely friable and tears like wet blotting paper. Gutierrez-Yepes and Eastman¹⁵ report: "In 11 autopsies at The Johns Hopkins Hospital, between 1896 and 1944, in cases of placenta praevia due to exsanguination, 6 revealed actual rupture of the uterus or extensive cervical laceration." I vividly remember trying to extract a 10 to 12 weeks' breech in an incomplete abortion and the large and deep cervical lacerations

that were present, plus the associated rapid and heavy blood loss. No imagination is needed to picture the result if this had been a case of placenta praevia. Green¹⁷ reported 2 cases of placenta praevia in early pregnancy. At 14 weeks, one was handled from below and the patient almost exsanguinated. Hysterotomy was eventually carried out in the second case, after much delay, and the patient, despite a very difficult time, survived.

One major advantage of abdominal delivery is visualization of the placenta site and prompt control of the large bleeding sinuses, either by use of an intrauterine pack or by direct sutures. Intrauterine packing from below is extremely difficult and unsatisfactory. The lower uterine segment is not well defined and cannot be packed properly. The cervical os is not very negotiable at this stage of pregnancy. Certainly, proper packing is difficult enough in the immediately postpartum term uterus, much less at this early stage, prior to the twenty-eighth week of gestation.

SUMMARY AND CONCLUSION

General consideration of etiology and pathogenesis of placenta praevia shows that this condition is rather common in the first and second trimesters of pregnancy; collected figures average 10 per cent of all such cases. Mismanagement and poor judgment can be fatal. The possibility of placenta praevia must be kept in mind. Abdominal approach may be necessary, not sterile procrastination and futile observation, especially in the face of severe hemorrhage and other unfavorable obstetrical considerations, such as lack of dilatation and/or effacement of the cervix. Chronic progressive bleeding that does not respond to conservative measures of bed rest, blood transfusions, and so forth, certainly can carry a patient close to deep and possibly irreversible shock before the physician is aware of the critical situation. The proper approach to therapy is individual, and once delivery from below is deemed unfeasible, the abdominal route must be used to prevent a maternal mortality or severe debilitating injury and morbidity.

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CONSERVATIVE SURGERY is recommended in cases of ectopic pregnancy if fertility is to be preserved.

After the pregnant tube is exposed and the tuboovarian artery is clamped and ligated, the oviduct is opened with scissors or a scalpel and the conceptus is enucleated. The oviduct is pinched lightly to control bleeding from the incision until the Bovie spark is applied. No effort is made to close the tube or to evacuate free liquid blood from the peritoneal cavity.

Operation has been performed for 12 patients without complications. No impairment of tubal patency was evident on postoperative salpingograms. In 3 patients, secondary laparotomy showed good healing of the tubes without deformity. Uterine pregnancy occurred in 1 instance after bilateral operation for successive tubal pregnancies.

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Surgical Treatment of Thyroid Cancer

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SO MUCH CONFUSION exists concerning the best way to handle tumors of the thyroid gland that even the most sincere physician finds it difficult to search the literature and emerge with a satisfactory set of principles to guide him in all the variations of this disease. Two major factors have been responsible for this confusion.

The first includes the vagaries of the natural history of the disease, such as thyroid cancers which kill patients within a year in spite of the most valiant efforts of control. Then, at the other end of the scale are patients with radiographic evidence of bone or pulmonary metastases who manage to continue their daily activities for as long as ten to fifteen years. These extreme variations in behavior make the usual five-year-cure yardstick of limited value and render any analysis of a given mode of treatment most complex.

The second factor which has caused difficulty is the pathology of these tumors. Although the gaps are now being slowly closed through continued efforts and perseverance by our colleagues, the pathologists, one has only to reflect on the significance of the term "benign metastasizing struma" to appreciate the confusion that has existed. The differences in end results reported by various authorities are sometimes so great that one wonders whether these authors are talking about the same thing. For example, a case may be diagnosed as papillary carcinoma by one authority and viewed as benign by another. Unanimous agreement on a classification has been difficult to reach, and the fact that "pure" types do not always exist and that "mixtures," of different types are often encountered has done little to clarify the situation.

In spite of these inherent difficulties, a review of the literature of the past twenty years indicates a tendency toward agreement by most authorities on at least some aspects of this problem. Furthermore, this agreement has been reached on points that were violently disputed as recently as five to ten years ago. The "lateral

aberrant thyroid" is a good example. In the mid-forties, these masses were explained on the basis of some embryologic malformations, a viewpoint championed by many capable authorities.¹⁻⁶ As further evidence became available, however, this theory was no longer tenable. The modern position is that such masses are, in reality, metastases from a primary tumor within the thyroid gland, even though no such primary tumor may be clinically obvious.⁷⁻¹¹ This new attitude is based on the results of serial studies, made by capable pathologists, of the homolateral lobe of the thyroid gland. A primary tumor was discovered in almost every case, and, with this discovery, the case for the so-called lateral aberrant thyroid disappeared, which, after all, was based only on circumstantial evidence.

Similarly, there has been much dispute about the advisability of exploring lumps in the thyroid gland because they might possibly represent cancer. The incidence of cancer in the nodular thyroid gland has been reported to range from 4 to 50 per cent.¹²⁻¹⁷ It is significant, however, that no such study has ever shown the incidence to be 0 per cent, and this statement requires no alteration whether the lumps in the thyroid are single or multiple. Most authorities recognize their inability to distinguish the harmful from harmless thyroid lumps based on clinical examination alone, and agree that surgical exploration with microscopic examination is indicated.

Frozen-section diagnosis of thyroid masses is now on a much firmer footing than any time in the past, and is being used more and more frequently as an integral part in the treatment. At some of the larger centers, such as Barnes Hospital in St. Louis and Memorial Hospital for the Treatment of Cancer and Allied Diseases in New York City, frozen section has been used in the diagnosis of thyroid cancer at the time of operation for more than five years, and a high degree of accuracy has been achieved.

TREATMENT

Everyone seems to agree that surgery is the most efficacious method of treating thyroid cancer. The controversies are not whether surgery should be employed but revolve around the types of operations that are indicated to cope

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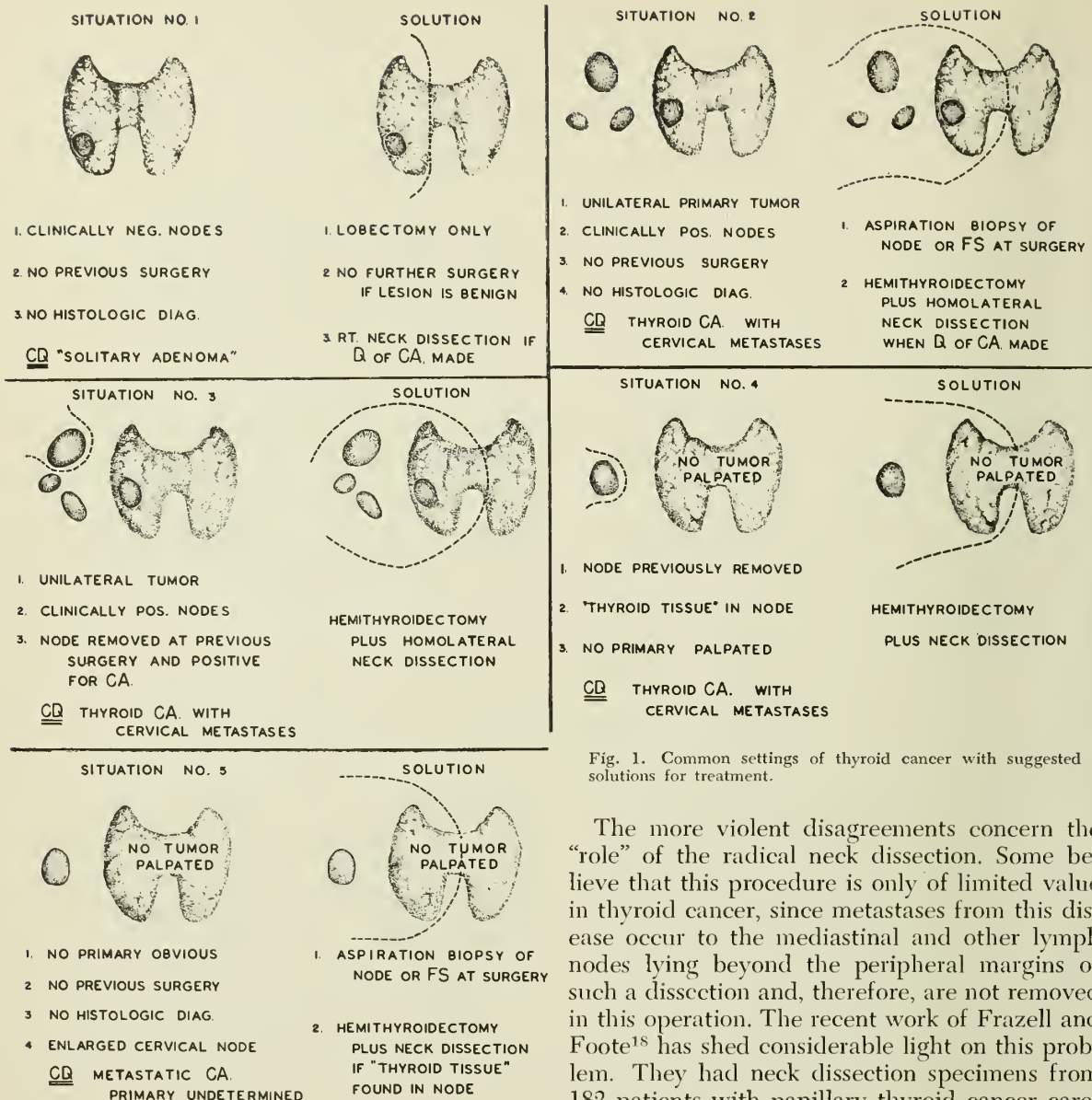


Fig. 1. Common settings of thyroid cancer with suggested solutions for treatment.

with the various settings of this disease. Some controversy still remains concerning whether subtotal or total thyroidectomy is advisable when the diagnosis of thyroid cancer has been established. The price of total thyroidectomy is approximately 2½ to 3 cents a day for artificial hormonal substitutions. Therefore, if there is any question about the surgeon's ability to circumvent the primary tumor with a less radical procedure, he has no reason for hesitating to remove the entire thyroid gland. On the other hand, if the tumor is limited and if its removal will leave the patient a remnant of normally functioning thyroid gland, the patient has one less problem in the postoperative period.

The more violent disagreements concern the "role" of the radical neck dissection. Some believe that this procedure is only of limited value in thyroid cancer, since metastases from this disease occur to the mediastinal and other lymph nodes lying beyond the peripheral margins of such a dissection and, therefore, are not removed in this operation. The recent work of Frazell and Foote¹⁸ has shed considerable light on this problem. They had neck dissection specimens from 182 patients with papillary thyroid cancer carefully studied for the presence or absence of microscopic metastatic deposits. They were divided into 2 groups: (a) those *with* clinical evidence of disease, and (b) those *without* such evidence. Metastases, if present, were plotted according to the levels of the neck at which they were found.

Several interesting facts emerged from this study. First, although no clinical evidence of metastatic cervical metastases could be detected, nevertheless, its presence was revealed by the microscope in more than 60 per cent of these patients. Second, the node-bearing areas at the peripheral margins of the dissection, mediastinum, and so forth, were never involved in the group operated upon without clinical evidence of metastases. However, these areas were posi-

SITUATION NO. 6



SOLUTION



1. MIDLINE TUMOR
2. NO PREVIOUS SURGERY
3. NO HISTOLOGIC DIAG.

CD "SOLITARY ADENOMA"

1. SUBTOTAL THYROIDECTOMY WITH ADEQUATE MARGINS
2. NO FURTHER SURGERY IF MASS POSITIVE FOR CA.
3. FOLLOW UP IF D OF CA. MADE
4. ND AWAITS CLINICAL EVIDENCE OF DISEASE

SITUATION NO. 7



SOLUTION



1. MULTIPLE NODULES
2. NO PREVIOUS SURGERY
3. NO HISTOLOGIC DIAG.
4. NO CLINICALLY POS. NODES

CB "MULTIPLE ADENOMATA OF THYROID"

1. SUBTOTAL THYROIDECTOMY
2. NO FURTHER SURGERY IF MASS NEGATIVE FOR CA.
3. ND ON CORRESPONDING SIDE IF D OF CA. MADE

SITUATION NO. 8



1. NO PREVIOUS SURGERY
2. LARGE PRIMARY TUMOR CROSSING MIDLINE
3. BILATERAL CLIN. POS. NODES
4. NO HISTOLOGIC DIAG.

CD THYROID CA. WITH BILATERAL METASTASES

SOLUTION



1. ASPIRATION BIOPSY OR FS OF NODE
2. SUBTOTAL THYROIDECTOMY PLUS ND ON SIDE OF GREATEST INVOLVEMENT FIRST
3. THEN ND ON REMAINING SIDE AS A STAGED PROCEDURE

SITUATION NO. 9



SOLUTION

NO FURTHER R IF EVIDENCE INDICATES ADEQUATE LOCAL REMOVAL

REGULAR FOLLOW-UP POST-OPERATIVELY

PREVIOUS OPERATION RESULTING IN D OF CA PT. REFERRED FOR FURTHER CONSULTATION

Fig. 2. Controversial and difficult settings of thyroid cancer with suggested solutions.

SITUATION NO. 10



SOLUTION



1. NO PREVIOUS SURGERY
2. LARGE PRIMARY TUMOR CROSSING MIDLINE
3. NO CLINICAL EVIDENCE OF METASTASES
4. NO HISTOLOGIC DIAG.

CD THYROID CA.

1. SUBTOTAL OR TOTAL THYROIDECTOMY
2. NECK DISSECTION ON SIDE OF GREATEST INVOLVEMENT IF D OF CA. MADE

tive for such metastases in a significant proportion of patients operated upon who showed clinical evidence of metastases. Third, in the clinically negative group, the cervical metastases were confined to either one or two levels in the neck in more than 80 per cent of the patients. But, in the clinically positive group, multiple node level involvement again appeared in a significantly high percentage of cases.

These facts all seem to support a hope that radical neck dissection has at least a chance of accomplishing total removal of all thyroid cancer, and that this chance is correspondingly greater when the operation is performed on patients with limited amounts of disease than when

it is used to remove excessive amounts of cancerous tissue. The classical cancer operations, such as the radical mastectomy, abdominoperineal resection, combined neck and jaw resections, and so forth, are all planned to remove the primary tumor and the regional lymph nodes at one time, with or without clinical evidence of nodal involvement. Until recently, however, surgeons have been reluctant to accept and apply these principles to thyroid cancer without clinical evidence of cervical metastases. These studies of Frazell and Footc have led us to wonder whether such an attitude is not a mistake. We now believe that thyroid cancer should be treated according to principles that have stood the test of time and appear to be producing reasonable salvage rates in cancer elsewhere in the body.

If the additional operative procedure of radical neck dissection produced a pronounced rise in the mortality and morbidity, its use might still be questioned; but the facts do not support such a claim. The mortality rate from a radical neck dissection, performed by the most capable hands, is 1.3 per cent, and patients average one week in the hospital after the procedure. Such an attack cannot be discarded on these grounds.

If so-called "giant cell cancer" of the thyroid is present, there seems little indication for ag-

gressive surgical treatment, since no known cure of this variant has ever been achieved by any single method or combination of methods. This comprises only about 10 to 12 per cent of all cases. With this one exception, we recommend the following steps in dealing with a lump in the thyroid gland. First, the usual collar incision is made and the mass is removed with a wide margin. This often requires total lobectomy with exposure and dissection of the recurrent nerve as an integral part of the procedure. In some cases, the mass may be more extensive and require total removal of the thyroid gland. Next, this specimen is sent to the laboratory for a diagnosis by frozen section. If the diagnosis is cancer, the incision is made suitable for radical neck dissection, which is performed with or without clinical evidence of disease at this first sitting. If the diagnosis is benign, the collar incision is closed and the patient is returned to the ward.

These principles seem applicable in about three-fourths of the thyroid cancer cases that we have seen. Some of the commoner settings, with suggested solutions for treatment based on these principles, are represented in figure 1. Even if the foregoing recommendations are accepted, other situations occur in which these principles of treatment do not provide an entirely satisfactory solution. About the only favorable remark that can be said about these settings is that they seem to form the minority. Under such circumstances, compromise appears to be forced upon us, and we handle the situation the best we can.

Examples of such cases are the midline cancerous nodule and the cancerous primary tumor crossing the midline and involving both sides of the thyroid gland. Without clinical evidence of cervical metastases, the surgeon would be quite at a loss to decide on which side to perform the

radical neck dissection, if he is dedicated to the principle of prophylactic or elective neck dissection, since the disease may spread either to the right or the left. In such a situation, we have been forced to remove the primary tumor and defer further surgery until metastatic disease has appeared and then treat it accordingly. Some of these more controversial and difficult settings with suggested solutions are shown in figure 2.

DISCUSSION

Efforts have been made by some authorities^{12,19, 20,21,22} to make exceptions in the treatment of some varieties of thyroid cancer, namely papillary thyroid cancer. Crile has even compared this variant to a basal cell cancer of the skin, or even a pimple.²² On the other hand, the group from Memorial Hospital asserts that if these patients are followed long enough — and this means more than five years in many cases — 21 per cent ultimately succumb directly to this disease.²³

As far as we are concerned, if the diagnosis of *cancer* has been made by competent pathologists, we believe that it should be treated from the very beginning with the best weapons at our command. These weapons should not be held in abeyance until less aggressive methods of treatment have been tried and found wanting. This seems a more reasonable method of therapy than some sort of "berry picking operation" executed with the belief that the patient has a biologically unaggressive variety of cancer, and that positive curative steps are not necessary.

The opposition's aversion to radical neck dissection in the controversial settings usually narrows down to the specific objection of hating to scar the neck of some young woman. Certainly the function after a radical neck dissection is too good to be abandoned on these grounds.

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Therapeutic Carefulness

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THE PROBLEM of overmedication, as presented by Dr. Milo Meyer in this journal about a year ago under the heading of Therapeutic Carelessness, deserves more than passing attention. This situation arises not only as the result of physician-shopping on the part of the patient, but also as the result of the physician's overzealousness in his desire to relieve the patient.

The origins of this problem are based on the age-old belief that symptoms always have a physical cause and that suffering is in direct proportion to the degree of organic illness. Such an idea overlooks the personality of the patient, especially in terms of his suffering and complaining. As a result, the doctor can follow several blind paths in his efforts to be a good physician.

First, he may overidentify with the patient in his suffering. He may feel pressed by his own needs to bring relief as he would want it himself. Consequently, he fails to see that perhaps the patient is unaware of how much he is complaining or that his apparent suffering is increased rather than diminished by drugs. Pain is a very subjective phenomenon as we all know. No two people react to the same discomfort in the same manner. Each person reacts according to his own emotional state and his own personality dictates. Pain and suffering or complaining are related as much to personality as to the extent of injury or degree of organic illness.

Second, the doctor's need to prove himself therapeutically may lead down a blind path. Each of us must work out our own salvation in regard to our therapeutic pride. Seeing each patient merely as a challenge to treat successfully and better than the next doctor is an error which can often lead to frustration. It is as apt to lead to "patient shopping" as to "patient comfort," because, in our haste, we miss the mark.

In the third instance, the physician may feel compelled to deny that the patient could have a psychologic problem. This attitude usually leads to the estrangement of doctor and patient, with

the doctor often blaming the patient for not taking his medicine as instructed.

The patient's role in the problem of therapeutic carelessness is basically the same as the physician's. He believes that if a little medicine is good, more is better and that his emotions cannot possibly contribute to his suffering. The patient has grown up with the conviction that there is a physical cause for physical ills. He feels that if he admits he has emotional complications and needs psychiatric help, he will be considered crazy or weak. This type of patient is convinced that doctors are omnipotent and that if he continues his search, he will find a physician who has this magic ability.

Illness produces a regression to a more dependent state in emotional development. It creates situations of varying degrees of helplessness. Just as the child is fairly capable of going along without his parents until he perhaps falls and suffers a painful skin abrasion, so the adult manages without the physician until he becomes ill. At this point, he becomes unrealistic in his demands and expectations, depending upon his degree of subsequent psychologic regression. Since the patient is too close to himself to be objective, the doctor must do this for him. In this situation, the physician meets with varying degrees of success, and his approach is not the answer in every case, but at least he is not contributing to the patient's "therapeutic delinquency."

The degree of regression, demanding, and suffering exhibited by the patient need not reflect his basic level of maturity. Many quite mature people with some types of illnesses become noticeably regressed. No shame need be connected with bizarre behavior exhibited during illness. The shame lies in failing to recognize it as being of a psychologic basis and perhaps beyond relief by medication alone.

The physician can reduce therapeutic carelessness by closely evaluating the patient's attitude when he seeks help. Meeting the patient's needs more directly greatly curtails "shopping," and reduces the amount of medication dispensed. A woman who is moderately depressed and suffering from associated physical equivalents because her family has grown up and left her alone, re-

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ceives more relief from an understanding attitude and an opportunity to ventilate her feelings than from several different medicines which only mask her symptoms.

Symptom relief must always remain foremost in the mind of the physician. However, patients who have been chronic sufferers for some time prior to consulting the physician can carry on awhile longer during a period of proper evaluation. A thorough effort to bring relief is acceptable to the patient and implies concern for his welfare. When this principle is universally ap-

plied, therapeutic carelessness will disappear.

A wise physician knows when and where to act and when and where not to. Treating many chronic sufferers medically is like the psychiatric treatment of the "empty bag neurosis" Bergler mentions. No matter what is done, it never seems to be enough or adequate. But, if the doctor keeps his outlook clinically objective and distant, he at least avoids rejecting the patient or "provoking" the patient to reject him. "Peaceful coexistence" with chronic complainers is not an unreasonable goal.

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THE DIFFERENTIATION of psychogenic from convulsive disorders may be aided by hypnosis during electroencephalographic examination.

In patients with organic epilepsy, hypnotic suggestion does not precipitate seizures or cause electroencephalographic changes. Technical quality of the electroencephalogram is often improved by hypnosis, since the patients are more relaxed and artefact is eliminated. With psychogenic disease, seizures may be induced and terminated by hypnotic suggestion; no electroencephalographic changes occur during the convulsive attacks.

In healthy persons, no consistent electroencephalographic alterations occur when subjective anesthesia, catalepsy, or automatic movements are induced hypnotically. The wicket rhythm is not changed by movement of hypnotically induced phantom hands. Hypnotic regression usually causes no significant change.

When sleep is produced in a person who is in a trance, the electroencephalogram may be flattened, spindles and V waves may occur, or high-amplitude 1- to 2-per-second waves may be recorded from depth leads in the frontal, the occipital, and the temporal lobes.

Alpha activity is suppressed in most instances when visual hallucinations are induced hypnotically, and lambda waves are often recorded. In contrast, lambda waves do not occur when a conscious patient imaginatively visualizes something. Lambda waves may disappear during hypnotic blindness.

BERT E. SCHWARZ, M.D., REGINALD G. BICKFORD, M.D., and WALDEMAR C. RASMUSSEN, M.D. (Mayo Clinic and Foundation, Rochester, Minn.). *J. Nerv. & Ment. Dis.* 122:564-574, 1955.

This department of THE JOURNAL-LANCET is devoted to reports on cases in which all the appropriate diagnostic criteria have been employed, the best known treatment administered and the results recorded. It is desired that these case reports be so prepared that they may be read with profit by physicians in general practice, hospital residents and interns and may be of considerable value to junior and senior students of medicine. This department welcomes such reports from individuals or groups of physicians who have suitable cases which they desire to present.

Cortisone Therapy in Lupus Erythematosus Disseminatus with Affection of the Central Nervous System

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LUPUS ERYTHEMATOSUS DISSEMINATUS has been the object of increased interest among neurologists because of improved methods of diagnosis and more effective therapy. In lupus, symptoms of nervous system involvement have been claimed to appear late in the course of the disease. More recently, cases have been reported in which the first symptoms were related to the nervous system.¹ The neurologic symptomatology often is extremely variable, making diagnosis somewhat difficult. The ability to identify lupus erythematosus cells (L.E. cells) in the blood^{2,3} has greatly facilitated the diagnosis. In many cases, cortisone and ACTH exert a favorable influence on the course of this illness.

This disease chiefly attacks collagen tissue in and around the small vessels,^{4,5} resulting in fibrinoid degeneration with reactive changes, cell infiltration and fibrosis, and the formation of miliary infarcts within the nervous system. Similar changes also take place in the larger vessels. These vascular changes may occur in the cerebrum, the medulla, or the peripheral nerves. In recent years, individual cases have been described in which lupus erythematosus produced

symptoms of polyneuritis,⁶ myelitis,¹⁻⁷ hemiplegia,¹ epilepsy,⁸ and psychic disturbances.

The following is a report of a case of lupus erythematosus observed in Den Neurologiske Universitetsklinikk, Bergen, from December 1953 to May 1955, and of the effect of applied cortisone treatment.

CASE REPORT

G. V., a 47-year-old woman, had suffered for many years from pain and swelling of the joints, which had been considered a rheumatic complaint and was treated with gold injections. In February 1952, she suffered an attack accompanied by "remoteness" and followed by prolonged aphasia. In April 1952, she was admitted to the neurosurgical department of Rikshospitalet of Oslo University, where special studies revealed atrophy of the left cerebral hemisphere. In June and November of 1953, the patient had prolonged febrile episodes during which grand mal seizures developed. Anticonvulsive medication was instituted and succeeded in controlling her attacks. She was first admitted to Den Neurologiske Universitetsklinikk, Bergen, in December 1953, with the diagnosis of symptomatic epilepsy of unknown etiology and lupus erythematosus nasi.

On admission, a histologic examination verified the diagnosis of lupus erythematosus. At that time, she had a reduced corneal reflex and a central facial palsy on the left side. The palate deviated to the right. Dysphasia was still present and was chiefly of a motor type. The spinal fluid was normal. Physiologic urine and serologic hies reactions were negative. Electroencephalogram showed a dysrhythmia characterized by theta-

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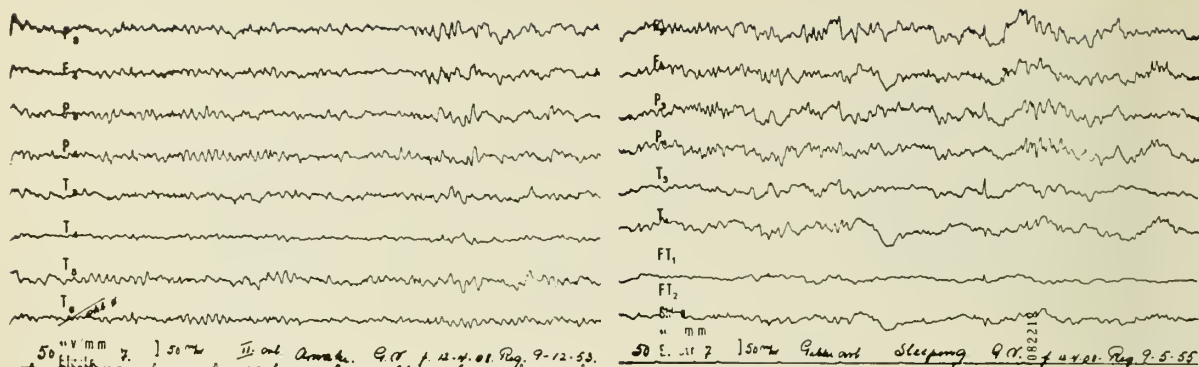


Fig. 1a (left). EEG from first hospitalization. Moderately irregular slow activity with overemphasis over left hemisphere. Fig. 1b (right). EEG from last hospitalization. Spike activity over left hemisphere.

delta activity with predominance of slow activity over the left hemisphere (figure 1).

In February 1954, the patient experienced a short period of diplopia. In June 1954, pain in the joints recurred, and, during the next few months, she was very febrile. She soon became nervous, depressed, and irritable. She was again hospitalized from July to December 1954. Her face was a blue-violet color over the nose and both cheeks. The chest roentgenogram showed slight pleural effusion on the left. The clinical diagnosis was now lupus erythematosus disseminatus, and laboratory examinations revealed L.E. cells in peripheral blood (figures 2 and 3).

Cortisone treatment was instituted on August 14, 1954 (figure 2). Under treatment with moderate initial doses of Cortone plus antibiotics, the patient became increasingly febrile and weaker. The dose was increased to 600 mg. daily, and, in the course of a few weeks, she

became afebrile and improved and by November was ambulatory. Cortone was slowly decreased to a maintenance dose of 150 mg. The edema was treated with ammonium chloride and Mercurgan. Electroencephalogram showed increased dysrhythmia with frontotemporal bilateral spike activity. During her third hospitalization in January and February 1955, her general condition continued to improve, but the neurologic findings were unchanged. Maintenance dose was reduced to 75 mg. of Cortone daily.

The patient was last seen in May 1955. Her condition was noticeably improved. Before admission to the hospital, she had been able to do a little housework and walk outdoors. The blue-violet discoloration of her face had disappeared. The neurologic findings were less pronounced, and the dysphasia, in particular, had decreased. The left-sided pleural effusion was reduced. Temperature was normal. Electroencephalogram showed dysrhythmia with spike activity (figure 1). The patient had had no seizures during the entire observation period. Laboratory findings (figure 2) showed that L.E. cells were still present.

DISCUSSION

This case is of interest because of the predominant involvement of the nervous system. The patient's aphasia, seizures, and other neurologic

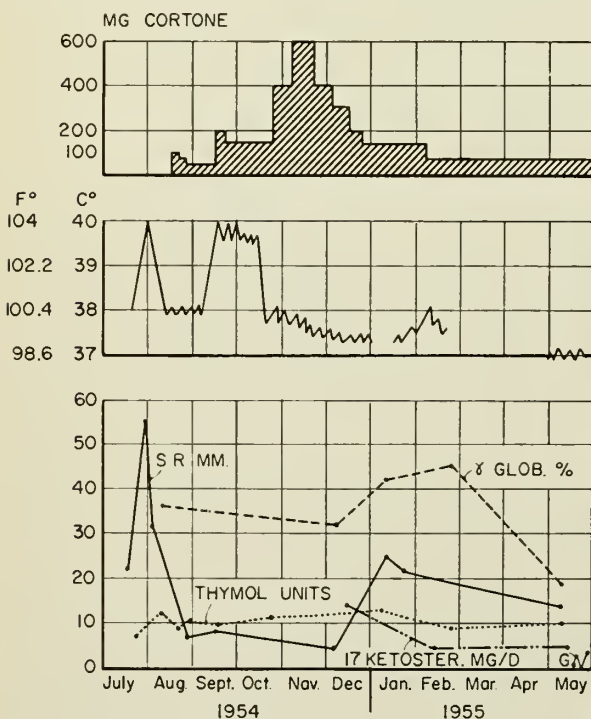


Fig. 2. Effect of cortisone treatment illustrated by temperature curve and the most important laboratory findings.

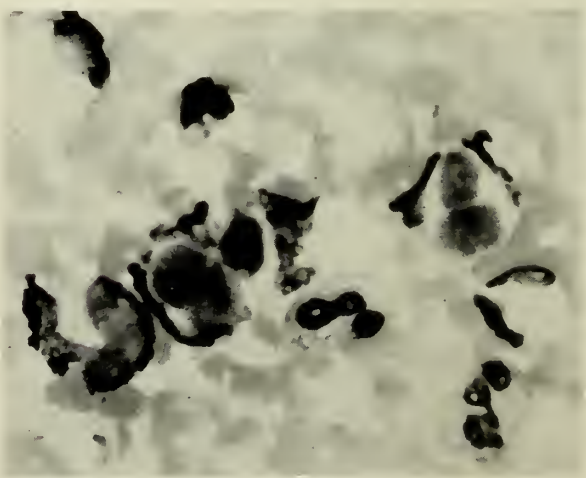


Fig. 3. Lupus erythematosus cells in peripheral blood. May-Grünwald-Giemsa stain.

symptoms must be considered to be caused by cerebral infarcts, which would also explain the electroencephalographic and pneumoencephalographic findings. Many treatment procedures have been tried in lupus erythematosus, but none has proved as effective as cortisone. However, it is important to emphasize the need of very large doses in some phases of this disease. In this case, 600 mg. of Cortone daily appeared to be necessary for control of the illness. In other reported cases, as much as 100 mg. hourly has been required. With such doses, injurious side-effects are to be feared. In this case, the facies of the patient took on a Cushing-like appearance, but the rise in blood pressure was slight, and the edema was mild and easy to control.

The effect of the treatment was first apparent in the improvement of the patient's general condition. The clinical neurologic symptoms showed some regression but did not disappear. This was to be expected, since the neurologic symptoms probably were caused by scar-like, irreversible nervous system changes. Another expression of this irreversible brain damage was evidenced by the electroencephalogram which did not seem to be influenced by treatment, as the dysrhythmia remained.

L.E. cells were identified even at the last examination, about nine months after commencement of cortisone treatment, and at a stage when

the disease was well controlled clinically. The presence of these cells probably indicates that treatment has not been curative, but has only arrested the course of the disease. This seems borne out by the persistently heightened SR and thymol values and the low albumen quotient. On the other hand, the gamma-globulin percentage became normal. It may be questionable whether the continued presence of L.E. cells is an indication for a continuation of massive cortisone treatment or whether this finding should be disregarded and treatment guided solely by the clinical observations. Discontinuation of the therapy would be expected to allow greater possibilities for exacerbation of the disease. We decided to continue the patient on the maintenance dose, upon which she is comfortable at the present time. We hope in this way to prevent exacerbations. She is still under very strict supervision.

SUMMARY

1. A case of a woman with lupus erythematosus disseminatus, in whom seizures and aphasia were the most prominent symptoms, is presented. L.E. cells were present and their diagnostic value acknowledged.
2. A very favorable therapeutic result was obtained with cortisone. Dosage under exacerbation and during the quiescent phase is discussed.

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Notes from a Medical Journey

September 7, 1956

Dear Jay:

Outside, a steady drizzle is falling from a lead-covered sky, and I am shivering at a temperature of about 52° in this Victorian-style bedroom at the famous Hotel Moscow a few steps from Red Square. You can picture the scene -- muddy cream walls bearing large oil paintings in gilt frames, a 12-ft. ceiling, imitation Persian rugs on the oak parquet floor, sofa and 4 chairs in red plush, dull gold brocade drapes, a round table covered with an embroidered cloth and bearing a large set of plum-colored cut glass, and a desk complete with a massive marble lamp and desk set. In the corner, beyond the maple-stained beds and wardrobe, stands the 9-in. television set that whispers to me in Russian (it won't turn off without pulling out the wire). The sound of the W. C., which also won't turn off, is a cheerful reminder that I have a private bath and lots of hot water.

I am really quite comfortable. Everything is spotless, and the coldness of the room is my own fault because I left the door of my little veranda open this morning when I went out. In half an hour we leave for a press conference with the Minister of Health, Madame Dr. Kovrigina, and I shall wear a sweater under my suit coat against the unseasonably cold weather.

These ten days in Moscow are a busy interlude for me during a month of research in Finland, where Drs. Paul Soisalo and Martti Karvonen have done well in organizing material for our comparative study of people in two parts of Finland who seem to differ greatly in the incidence of heart disease. When I left Helsinki on August 29, Dr. Karvonen and our old friend, Dr. Flaminio Fidanza of Naples, were continuing in fine shape our work on population samples in small towns in western Finland. Dr. Rautajarvi, an electrocardiographer, a technician, and a nurse complete the team.

This Saturday I shall return briefly to Finland, then to Stockholm for the European Congress of Cardiology, and finally back to Finland for our work in eastern Finland which ends October 2. I'll write about Finland in another letter.

In the meantime, Drs. Paul D. White, Howard Rusk, Herman Hilleboe, James Watt, and Mark Field (the latter a Harvard sociologist who speaks Russian) and I are breaking the ice with our Russian colleagues. We have a hectic program of visits to clinics, laboratories, institutes, receptions, and dinners. In the evenings, we just manage to arrive at the opera or ballet before the doors close at 7:30. We have had no time to eat by then but anticipate a big spread at 11 or 12 p.m. As guests of the Soviet government, we are royally treated and our Russian contacts could not be more cordial.

The ballet is, as expected, really great, and the operas are most elaborately staged, though I think the singing is not quite up to the high level of the sets and costumes. Tonight, Paul White and I are released from the theater to dine with academician professor Mjasnikow at his home. This is the first, and only, visit to a private home.

Dr. Mjasnikow is the director of the Therapeutics Division, that is, the Department of Medicine of the First Moscow Medical School. He is the local leader in research on hypertension and atherosclerosis. He is a big, bald dynamo of a man who moves and thinks at high speed and looks as strong as an ox. His forcefulness was demonstrated in two "conferences" when he treated us to several hours of didactic lectures without interruption from us or his top associates, professors Speransky and V. Parin.

There are 3 medical schools here in Moscow with a total enrollment of about 10,000 students in the six-year course. They enter at 18 or 19, and the last year is really a rotating internship so they are ready to practice at age 24 or 25. The more able and ambitious stay on for another three years to specialize, which means they will begin practice at twice the salary of the ordinary doctors just starting.

I find it difficult to untangle the complicated setup of institutes and the extensive organization run by the Academy of Medical Science. Among other things, the top professors have several jobs, with separate incomes from each, so they are really very well paid and are generally pampered as well as made to work hard.

Now I am back from the press conference which went off well with some 30 or 40 reporters, many representing United States wire services and newspapers. Madame Kovrigina was relaxed and friendly, obviously competent, and quite able to handle the rather sharp questions put by some of the reporters. Paul White read a statement from our team which we had agreed on at a breakfast conference this morning. The gist was that we are opening the way for future closer contacts between the American and Russian doctors, discussing with our Russian colleagues problems of research on the epidemiology of heart disease and of rehabilitation, and that we are not competent, after so short a visit, to comment authoritatively on the local medical scene, but that we are impressed with the doctors' and nurses' devotion to their work. Questions and answers followed, and each of us said a few words.

Before the press was admitted, we extended a formal invitation to the Minister to have 4 Russian doctors spend six to eight weeks in the United

States: two in New York, one with Paul White in Boston, and one with me in Minnesota. He had state department clearance on this. Madame Kovrigina immediately expressed her gratification and assured us that her government would accept and proceed with arrangements.

All this was announced to the press conference a few minutes later and created much interest. I shall be curious to know how the newspapers at home report it.

In a few minutes, I must go to dinner with Paul at Professor Mjasnikow's home. Professor Speransky will be there to act as our interpreter, and it is to be a small intimate affair.

Of course, there are many events and impressions to tell you about, and, if time permits, I shall try to add to this letter later, even though it grows over-long, because it isn't often that I can write to you with a Moscow date line.

Later (September 7.)

Before discussing our dinner with Professor Mjasnikow and the farewell dinner of the Ministry, I will go back to the trip from Helsinki and some of the other subsequent events.

First, you may recall that last November I was in Helsinki to give a lecture and to talk about the possibility of some joint epidemiologic research on heart disease in Finland. This was agreed, and the Finnish Heart Association, as well as the Finnish State Pension Bureau and the Society of Finnish Physicians, decided to help. Then, last May, Drs. Soisalo, Karvonen, Fidanza, and I met in Rome, where I was acting as chairman for the Calories Committee of F. A. O. (of the United Nations) and arranged details. The main point at issue was, as I have said, the indication of large differences in heart disease, mainly coronary, between different parts of Finland.

We agreed to meet in September, which would include the dates of the European Congress on Cardiology. In April in Japan, Paul White had told me he wanted to look at our work in Finland and hoped he and I could take a side trip to Moscow. He had long talked about going to Moscow, and, at last, the green light was showing. The result was that the Soviet Ministry of Health first agreed to let us in, and then went further and invited us to be official guests of the Russian government.

So, on the evening of August 29, our Finnish friends drove us to the Helsinki airport and, after a minimum of formalities, we boarded a 2-motor Russian 'plane and set off, somewhat surprised at the absence of seat belts and "no-smoking" signs. The Russians think these precautions tend to produce an unfortunate psychologic atmosphere for the passengers. There were only 8 or 10 other passengers, and we were left to our own devices in the absence of the stewardess who, we were told, had suddenly taken ill.

In no time at all, we were up at the end of the Gulf of Finland, and the lights winking from towns and isolated houses below were, unbelievably,

Russian, and the approaching myriad of lights was Leningrad! Since the 'plane was not pressurized, we experienced alternating deafness and popping of ears, announcing the approach to Mother Earth which we met with a sudden swoop, a rough bounce, and a long taxi along a huge, but deserted, series of airstrips up to an ornate, but also deserted, airport building. Passports were relinquished, money was accounted for, and we ate a pretty good supper in a restaurant resembling a bad imitation of a nineteenth century "grand salon," complete with great marble pillars and fancy plaster arabesques on the walls, all completed after the last war.

Then, on again, growing more and more sleepy in spite of occasional bumpy pockets until, finally, the lights of Moscow appeared which extended as far as we could see for half an hour before our arrival at 1:00 a.m. Many people are on the ramp, names and handshakes are flung at us, and there is much confusion until we are bundled into big cars and sped on through the night to the Hotel Moscow. Of course, we are tired, but, at 2:30 a.m., we must sit down with our official greeter, Dr. Popoff of the Ministry, to a big supper with wine and toasts in the echoing emptiness of the great dining hall of the Hotel Moscow.

Since then, with interludes for sleep, we have visited clinics and laboratories and conferred and eaten too much and have been greatly impressed with the genuine friendliness of our Russian colleagues and everyone we have met in Moscow. At each visit, there are little speeches telling us that we are welcome to see anything we want and, actually, they have been as good as their word.

The hospitals are big, clean, crowded, and a bit shabby. Paul White took delight in examining patients, and we discussed each case with a crowd of hospital staff members and photographers who were as interested as we were. Naturally, we saw many cardiac patients and there is no doubt that they are plentiful.

Coronaries are managed "conservatively," and we saw quite a few marks of leeches and of cupping, the former over the precordium and the latter on the back. Anticoagulants are given chiefly to patients in their second or third occlusions. Oxygen, too, is only occasionally given, usually by nose-mouth masks apparently, although we saw no apparatus actually in use.

Hypertension is common, and we noted that many hypertensive patients, like some of the coronary patients, were obese. However, we did not find evidence that much attention is given to this problem or that height-weight measurements are used to estimate overweight. One of our omnipresent interpreter-guides, Vladimir, a graduate student in economics, told us about his mother who is in and out of hypertensive heart failure and is grossly obese. She claims that she feels better when she eats a great deal. Apparently, she was never advised to reduce.

Much cardiac and vascular surgery is done, particularly mitral valvotomies and closure of the open ductus arteriosus. Dr. Meschalkim, a kindly and genial thoracic surgeon of 40 years of age, who accompanies us

much of the time but who speaks only Russian, told us that simple digital dilatation of the stenosed mitral valve is always tried first. Only if this is obviously impossible is the valvulotome used. The ductus arteriosus is usually doubly ligatured and severed.

Large scale surveys of blood pressures are made and the incidence of "hypertension," defined as something like 2 standard deviations above the average for the age but without great statistical elaborations, was said to be 4.6 per cent among 200,000 men and women checked in Moscow factories and organizations. Hypertensive workers thus found are given a course of treatment for a month or so, which may be repeated. Therapy involves an attempt to discover and remove emotional tension associated with the job and residence at the "prophylactoria" connected with the place of work. Ordinarily, no dietary measures or drugs are prescribed at this stage, and the local view is that essential hypertension is a psychosocial disorder. Renal disease, pheochromocytoma, and so on are recognized as giving rise to "secondary" hypertension.

Atherosclerosis is considered a metabolic disorder in which liver dysfunction and ascorbic acid deficiency may play a role, aided and abetted by emotional factors and imbalance of the autonomic nervous system. Ascorbic acid, 200 mg. intravenously or 1 gm. orally daily, is said to lower the blood cholesterol and correct the lipoproteins. The latter are estimated in research at the First Medical Clinic by paper electrophoresis -- staining the paper strips and measuring the stain eluted from these strips. This was my friend Swahn's method of several years ago, although his name was not mentioned.

The surgeons were justly proud of some new automatic stitching machines for anastomosis of blood vessels down to a millimeter or so in diameter. The devices are really clever staplers that use fine tantalum wire. We also learned that local anesthesia is used a great deal but not to the exclusion of inhalation and other forms of anesthesia. Two days ago we were shown 4 brain tumor operations in process simultaneously, all under local anesthesia.

Student laboratories are small and pretty elementary, but there is much modern equipment in the research laboratories, some made locally and other items from abroad. We noticed especially fine x-ray equipment from Sweden and Holland, electrocardiographs, such as the "Galileo," made in Florence, Italy, and the "Elema" from Sweden, and a Beckman spectrophotometer from the United States.

The more technical laboratory work is all done by doctors, usually women. At present, 70 per cent of the medical students and over half of the practitioners are women. Surgeons, however, are almost all men. Marriage and children are no deterrent to remaining in full-time medical work, and the wives of many medical school professors are physicians, frequently in specialties other than those of their husbands.

Medical care is free for all and at a common level. In the wards (we saw no private rooms, and most wards had 8 to 16 patients), we found doctors,

lawyers, engineers, chauffeurs, and so forth side by side to everyone's seeming satisfaction. Outpatient services, too, are free except that the patients pay for their drugs which are cheap. Autopsies are said to be universal in all deaths, although we had no details, and this statement was merely made in passing by the Minister of Health. Here in Russia, it is sometimes difficult to discriminate between ultimate goals and present fact.

1 a.m., September 8, Moscow

Stimulated by Borodin's "Prince Igor" at the Bolshoi Theatre, followed by a snack of caviar, smoked salmon, and a glass of white Georgian wine a few minutes ago, I am wide awake enough to add more to the tale of our Russian adventure.

First, the dinner at the Praga Restaurant, given by the Ministry of Health this afternoon, was a memorable occasion with bright sun pouring in the big windows of our top-floor dining room. The table for 26 was bathed in this light and the reflections from the opposite wall of mirrors. The Minister of Health, Dr. Kovrigina, presided and soon a constant round of little speeches were given by most of us, all to the effect that we agree our mission has been a success and that all of us want only peace and friendship and that we hope to meet again.

This sounds trite and stilted, but the atmosphere was anything but that. All of us are going away convinced that these people really are human and really do feel friendly and want to share with us in the common task of making mankind better. This has nothing to do with politics, and several times we — and they — acknowledged the fact that our political philosophies are different. Anyway, I am sure that the people we have met are just like us, that is, simple doctors and university professors whose main interests are professional and whose secondary interests are in common grounds of art and gardening, music and walking in the countryside, football, and literature.

Finally, we exchanged some gifts, and it was wonderful to see Paul White embracing Madame, the Minister, with kisses on each cheek! Later, we had a similar full round at the Hotel Moscow with Professor Meschalkim and his wife, who brought presents on behalf of the Academy of Medical Sciences.

Now, a few more facts about our visit. We made repeated efforts to obtain vital statistics but were only given crude mortality rates (neither age nor sex-specific) for cardiovascular disease and told that life expectation in Russia had been doubled since the Revolution. For all cardiovascular disease, including cerebrovascular lesions, we were given the crude mortality figure of 205 deaths per 100,000 in 1954. This is less than half that for the United States, but, of course, this means nothing without data on the age distribution of the population and the ages of the dying. Furthermore, there is the problem of finding a comparative basis for ascribed causes of death. The Russians do not use the International List of Causes of Death, but I am promised a copy of their own classification. However, their diagnoses seemed to coincide pretty well with our own, judging from the 100 or so patients Paul White examined very briefly.

We were greatly interested in a rural health center and hospital some 45 kilometers, or 30+ miles, from Moscow. Whether it is typical or not I don't know, but they had little time to spruce up the place because we only asked to see such a center the day before, and, obviously, no other foreign delegation had been to this spot.

Most of the trip was along the main highway to Kiev, which was wide enough for 3 lanes each way but not so marked and not necessary with the light traffic. But, when we turned off on the little road to our village destination, we slowly lurched along on a so-called detour, clearly impassable in wet weather.

We had 2 women doctors as guides who spoke only Russian and who were, respectively, the head of the Maternal and Child Health Division of the Moscow Health Region and one of the inspectors. At our destination was an old 2-story stucco building and outlying wooden structures housing 27 inpatients, a polyclinic with dental office, examining room, room for minor surgery, x-ray room, treatment room, laboratory, and a delivery room where 80 to 90 babies are born annually. Major surgery is performed at another center 7 miles away. The whole establishment was fairly rough-and-ready but scrupulously clean and seemingly efficient.

The staff consists of 4 doctors, 8 nurses, and a pharmacist, all women. They care for some 5,000 people in a dozen villages and some state and collective farms. A file is kept on each family, and everyone is supposed to have semiannual health checkups. The patients were cheerful and appeared to be receiving reasonable medical care. We went away impressed, as elsewhere in the hospitals, with the staff's devotion to their jobs. And, as elsewhere, everyone was friendly and unreserved.

Well, there is much more I'd like to report if I had the time, such as the delightful intimacy of our dinner in Professor Mjasnikow's small flat, his remarkable collection of fine paintings, our discussion of the medical problems of presidents and Soviet leaders, the high prices of tawdry clothes, the many shops full of fancy but, to us, expensive foods, the motley picture of all races and nationalities in the Moscow Hotel and among the crowds on the streets, the difficulties of both drivers and pedestrians with the new antinoise law, the lack of anything at reasonable prices to buy to take home, and so on.

The outstanding memory for us will surely be the great cordiality and hospitality we met on every side. We like to think that, in our small way, we contributed something to better understanding and a more friendly future between our doctors and our peoples.

Regards to you and all our friends in Minnesota,

As ever,

A handwritten signature in cursive script, reading "Ancel Keys".

A Challenge

IN 1947, the use of streptomycin in the treatment of tuberculosis gave a sudden lift to our hopes for the eventual conquest of the disease. Combinations with PAS and isoniazid have provided added effectiveness. Other drugs are being intensively studied in hospitals and sanatoria. This avenue of approach to restoration seems certain to improve.

When the definitive surgical removal of the caviated discharging and, therefore, infective portion of the diseased lung became possible, a wave of optimism struck not only the public but the medical profession as well. As a result, a distinct feeling arose that an early solution will be found to the problem of eliminating this scourge. Such optimism is not justified. The attack is still from the wrong angle.

True, the known case, if properly treated, is now restored to the community as a contributor to the economy and not a distributor of infection. However, we must remember that the process is a slow, painstaking one and full of pitfalls for the unwary. Successful management must be unwavering and uninterrupted and requires the utmost skill and training. The ultimate cooperation of the patient and the family is necessary, and treatment must be continued indefinitely after recovery or apparent arrest has been achieved.

The family physician must be alert. He will be importuned to assume the care in the home of the active case. We remember the calculation by Dr. James E. Perkins, managing director of the National Tuberculosis Association, that the cost of the average case of tuberculosis is about \$15,000 including medical care, compensation, pensions, relief payments, and loss of wages. However, since this does not include the loss of potential earnings, it is not strange that few can bear such a burden without assistance.

Nearly everyone afflicted wants to be cared for at home. Few people are sufficiently informed to desire treatment in a sanatorium. Unless the physician is alert to the probable course of the disease and firm in his advocacy of sanatorium care, he may yield to entreaties and attempt home treatment with drugs. The patient soon becomes aware of the expense involved. In time, he may assume that he has sufficiently recovered and abandon the treatment. This is not a theory — this has occurred repeatedly. The physician is left helpless, and the patient is

often hopeless. Many pitiful instances of this situation can be cited by anyone with experience in the field.

In the sanatorium, the entire cost of long-term care is supplied except for the very small percentage of patients who can well afford such expense. In fact, the patient who is charged a token part pays less for sanatorium treatment than for home care. The problem of expense is, therefore, eliminated, but this is only the beginning. Infinitely more important are skill and specialized medical care by a staff alert by experience to the many pitfalls awaiting the unwary.

In the sanatorium, a rehabilitation program under skilled management is started immediately with (1) education, (2) occupational therapy, (3) recreation, (4) medical social service, and (5) vocational guidance and placement, which is the *sine qua non* of a successful program of restoration. Such a program can be furnished only by an institution. The need for morale building was emphasized by Osler more than a generation ago. Indefinite follow-up is needed to forestall the consequences of relapse.

However, the attack has just begun in spite of the mounting success in removing the patient with a known case of tuberculosis from his community as a source of infection and restoring him as a productive citizen no longer a burden to himself or the community. While the death rate has already fallen to a remarkable degree, the incidence still remains little below that of ten, even twenty, years ago. Community-wide surveys, incomplete as they are, reveal shocking numbers of individuals in the infective stage who are unrestricted in the community and seeding the germs of the disease in ways which we often cannot as yet trace.

The 149 new active cases found in Minneapolis and Hennepin County in 1954 illustrate this point. Of these cases, 35.6 per cent were reported from physicians' offices and public clinics, and 21.7 per cent were hospital inpatients. Mobile-unit surveys and physical examinations with roentgenograms of apparently healthy people located 23.5 per cent, while follow-up of contacts of active cases accounted for 6.6 per cent; 2.4 per cent were found in death reports and were not previously reported.

The attack rate in the 1950 to 1954 average by age and sex shows that men over 45 years of age comprise the group most likely to develop tubercu-

losis. Many of them are still supporting a family. The "dangerous age" for women is from 25 to 44, and for every woman who breaks down in this age period, there are almost twice as many men. In the occupational groups, new active case rates in 1954 were highest among the unemployed and next among food handlers and maids.

The most recent report of the Mobile-unit surveys in Minneapolis and Hennepin County covers the period from August 1955 through September 1956. This study revealed 250 previously unknown new cases, 32 of whom were active spreaders. Of the latter, 9 were found in the Gateway district, 3 at Seven Corners, 6 in the workhouse, and 3 in the city jail. The remaining 11 were discovered in various locations throughout the city.

Routine roentgenographic surveys of all hospital admissions bring to light a significant number of cases. Sanatorium staffs also report a sequence that has not received sufficient attention from the general medical profession. Many cases appearing at first to be atypical, or so-called "virus" pneumonia, recover from the acute attack only to break down much later and prove to be of tuberculosis origin instead of "virus." The development is usually so insidious and symptomless that only frequent and systematic follow-up can detect this sequence before it becomes a cavitated source of illness and infection.

Conditions in sanatoria throughout the nation quite generally follow a pattern illustrated by the stage of disease on admission recorded in Glen Lake Sanatorium. Approximately 10 per cent only are incipient and usually nonspreaders. Fifty per cent are moderately advanced, and 40 per cent are definitely far advanced. Thus, nearly 90 per cent of those admitted are spreaders of the disease. Local conditions in one small area have been cited just to illustrate the fact that innumerable sources of infection are present in a community which prides itself on accomplishment in this field.

Tuberculosis exists throughout the known world and has existed since disease in man became known. The causative organism has been known for only seventy-four years — only a moment in human his-

tory. Our success in its suppression has just begun. There is an enormous amount of tuberculosis in countries in which health measures are still retarded. This illness can be and is brought in in unknown quantities, since communication has enabled populations to shift so rapidly.

When we turn to our own country, we learn through the National Tuberculosis Association that "If by magic we could eliminate today all the known tuberculosis cases, we would still have about 50,000,000 people in this country harboring live, virulent tubercle bacilli in their bodies." This seems incredible until we remember that, in the vast majority, the disorder is inactive, but the fact impresses upon us the widespread silent character of the infection.

The United States Public Health Service reports "It is important to note that more cases of active tuberculosis have been diagnosed in the first six months of 1955 than in the same period of 1954. This indicates that there is no relation between the falling tuberculosis death rate and the prevalence of this disease." Competent authority states that active cases are currently being reported in excess of 75,000, and more than 15,000 die each year.

Here we rest our case. We conclude:

1. Efforts to find the active spreader of infection need to be intensified. While greater search must be made among the ethnic, occupational, and age groups most heavily infected, all possible sources must be explored.

2. All known cases must be removed from situations in which they can infect others. Isolation provided by the sanatorium is the only assurance against such infection.

3. Treatment now available must be applied under competent management without prospect of interruption and with complete rehabilitation as an added objective. Such treatment again means sanatorium care.

4. Research must be intensified. There must be no letdown in the provisions for sanatorium care. Adequate facilities must be provided for communities not so equipped.

S. MARX WHITE, M.D.

Conference on Aging

THROUGHOUT the two-day Conference on Aging called by Minnesota's Governor Orville L. Freeman, the important role of medical and health services in meeting the problems associated with growing older was emphasized.

Nearly 700 persons attended the conference that brought together information developed in 45 "grass roots" county meetings earlier in the year. From their work and that of a Minnesota Citizens Council on Aging and a state interdepartmental committee on aging will come the groundwork for local community programs, continued planning at state and

local levels, and detailed proposals for legislative action.

Nationally recognized experts in geriatrics worked with state leaders in the field to guide the discussions of 14 workshop sessions devoted to employment and retirement, education, housing, health services and facilities, social and economic factors, and recreation and community resources.

Governor Freeman keynoted the conference with a plea for help in developing a program for immediate action in meeting the problems of aging. In response, the conference participants recommended

establishment of specialists to assist and coordinate local programs, similar to county agricultural agents. The group supported proposals for increased legislative subsidies for visiting nurses; establishment of community mental health clinics; tighter licensing of nursing homes; and increased facilities for housing, education, and recreation for older citizens.

Family doctors were described as the gatekeepers for the wide variety of medical specialty groups and ancillary services for older people by Dr. Mario Fischer, Duluth, Minnesota, public health director.

"Strides and advancements have been made with the control of bacterial insults with antibiotics," he said. "Now efforts need to be directed toward the community at large, probably on initiation of doctors, in the prevention and cure of chronic illness."

Health services for older people are dependent upon getting the right kind of service in the right amount to the right person at the right time, and the place to start is with the doctor, according to Ollie A. Randall, New York. She is chief consultant to the study project in services for the aging of the Community Service society. She praised the trend toward care of older people in their own homes as a means of providing doctors an opportunity to find out how their patients live at home and to learn the attitudes of the families. Social workers and visiting nurses, too, can get closer to the intimate forces that destroy or prevent the possibility of improvement, she said.

Dr. R. H. Wilson, Winona, Minnesota, president of the Minnesota State Medical Association, foresees the need for large numbers of trained people to meet the problems of aging. But already, he said, much is being done as evidenced by the increase in cost of medical and health care for old-age assistance cases in Minnesota from \$750,000 in 1945 to \$15,000,000 in 1955. Old-age assistance recipients are receiving care the average citizen can't afford.

Dr. S. D. Pomrinse, chief of hygiene of the aging in the division of special health services of the department of health, education and welfare, Wash-

ington, D. C., rated the prevention of illness in older people as a top priority. Intensive medical screening of presumably healthy persons without symptoms could best be done in the offices of private physicians and would greatly reduce the costly complications seen today. He also urged medical schools to do more in bringing geriatric problems to the attention of students, not through geriatricians or departments of geriatrics but through "spark plugs" on the faculties who are interested in the field.

At least 75 per cent of the medical and physical care of geriatric patients can be provided in local communities, Dr. Frederic J. Kottke, head of physical medicine and rehabilitation at the University of Minnesota, declared. Even now, however, services that are available are not being used fully, he said.

At other conference sessions, Dr. Winfred Overholser, superintendent of St. Elizabeths Hospital, Washington, D. C., reviewed the emotional problems of aging and stressed the importance of balanced nutrition to prevent avitaminosis and other deficiencies of the "tea and toast" diet so characteristic of older people.

Dr. Edward J. Stieglitz, a consulting editor of Geriatrics and geriatrics consultant to the Veterans Administration and to St. Elizabeths Hospital, Washington, D. C., urged doctors to practice "anticipatory medicine" to help their patients prepare for and accept changes of maturation.

The importance of counseling to aid personal and social adjustment in old age also was emphasized by Professor John E. Anderson of the University of Minnesota, a past president of the American Psychological Association division on maturity and old age.

Chairman of the conference was Professor Walter K. Vivrett, who is director of a planning study on the housing for aging in the University of Minnesota School of Architecture and also chairman of the governor's citizens council on aging. Jerome Kaplan, special assistant on aging to the governor, provided the over-all technical leadership.

WENDELL WEED

Comments concerning this Section, criticisms, or suggestions for papers will be most welcome. Physicians are cordially invited to submit articles pertaining to pain for consideration. All inquiries and manuscripts should be sent to Dr. John S. Lundy, 102 Second Avenue Southwest, Rochester, Minnesota, or to the Editorial Department, THE JOURNAL-LANCET, 84 South Tenth Street, Minneapolis, Minnesota.

The Modern Treatment of Migraine

NEVIL LEYTON, M.R.C.S., L.R.C.P.

London, England

DR. NEVIL LEYTON, M.A.(Cantab.), M.R.C.S., L.R.C.P., of London, England, has written a book entitled, *Migraine and Periodic Headache: A Modern Approach to Successful Treatment*, which so impressed the Editor of the Section on Pain of THE JOURNAL-LANCET that he urged Dr. Leyton to prepare an article dealing with the subject for some future issue of the Section on Pain. This has been done and an article entitled, "The Modern Treatment of Migraine" appears in this issue which should be of interest to most of the readers. Dr. Leyton is honorary physician, Migraine Clinic, Putney Health Centre and clinical assistant, King Edward VII Hospital, Windsor. The second edition of his book was published in 1954 in London by William Heinemann Medical Books, Ltd. It contains 128 pages, and the price is \$2.50. The book may also be obtained from the publisher, Charles C Thomas, Springfield, Illinois.

JOHN S. LUNDY, M.D.

MIGRAINE is not a new disease. It must, indeed, be one of the earliest described, since both Galen and Aretæus mentioned it during the first century of the Christian era. Nevertheless, although a common complaint, until the last decade it had never received the attention or the sympathy that it deserves. It is impossible to say why this is so. Probably, the explanation is that the disease does not manifest itself by physical signs. Thus, classed among the less serious groups of headaches, little interest has been elicited from those in the medical profession.

This attitude has been present for so long that the deep-seated fallacy still exists among the majority of physicians that not only is migraine a mild complaint, but that it is untreatable, certainly as far as the prevention of attacks is con-

cerned. Until a generation of students has been taught that these severe periodic headaches can, in a significantly high percentage of cases, be prevented from occurring at all or to occur in a much milder form, it is doubtful if the general public will have access to such relief. It must be emphasized, however, that a small proportion of practitioners realize what can be done and, even though considerable trouble may be entailed, they are prepared to undertake the necessary therapy.

INCIDENCE

Since migraine is neither a lethal nor notifiable disease, it is impossible to make dogmatic statements about its frequency. Over the years, many workers in various countries have presented widely differing percentages for the incidence of periodic headache. Grimes,¹ in the United States, found that among 15,000 headache patients examined in general practice, 8 per cent suffered from migraine. Lennox² reported an incidence of 4 to 5 per cent in 1,000 medical students and nurses examined at random. Fitz-Hugh³ noted a migraine rate of 22 per cent in 4,000 unselected cases from his records. More recently, Atkins,⁴ making a survey among Welsh miners, found that in a small series of cases, 12 per cent of healthy individuals were prone to this disease. However, after infection with *Leptospira icterohæmorrhagiæ*, the percentage was approximately doubled. Fry,⁵ in 1956, reported that headache was the presenting symptom in 12 per cent of patients seen in a sub-

urban practice near London. From this report, at least 4 per cent of the population appear to suffer from migraine in England alone, and a significant 300,000 are prostrated at least once weekly by their attacks.

It must be conceded, therefore, that the incidence of migraine varies between 4 and 8 per cent. So, the frequency of the disease clearly indicates that the complaint presents a serious problem from the standpoint of both medicine and industry.

ETIOLOGY

For many years, the cause of migraine was a mystery. As long ago as 1846, Auzias-Turenne⁶ thought that migraine resulted from compression of the trigeminal nerve in the region of the cavernous sinus. Since that time, many other theories have been advanced. Cortical irritation was the reason according to Moebius,⁷ who considered the possibility of adhesions between the dura and cortex. The fact that duodenal stasis could cause periodic headaches was the theory of McLure and Huntsinger.⁸ Hunt⁹ felt that auto-intoxication from chronic intestinal stasis was the answer to the problem. Sanders¹⁰ was more reasonable in theorizing that an underlying endocrine dysfunction was the basic reason for the attacks, since they occur so seldom in pregnancy.

In 1926, Bramwell,¹¹ lecturing at the British Medical Association meeting, covered the etiology of migraine known at that time. Even then, he indicated that probably two phases were concerned in the migraine syndrome, that of initial vascular spasm and the following dilatation.

Some sixteen years ago, Wilson¹² summarized the physiologic changes in migraine as: (a) a vascular disturbance, (b) cerebral edema due to increased capillary permeability with a possible anoxemia or, perhaps, an allergic response causing an angioneurotic complex, (c) a disturbance of the sympathetic or parasympathetic nervous system, and (d) an endocrine dysfunction.

Since then, Wolff¹³ has pointed out that initial capillary constriction is evidenced by the premonitory scotomata and paresthesia, while a subsequent dilatation of the cerebral vessels causes the actual headache. Goltman¹⁴ appears to be the only observer who has seen changes occurring in the cerebral tissues during an actual attack of migraine. Pain pathways have been traced by Rowbotham,¹⁵ and he showed that the painful impulses travel to the sensory area of the brain by the upper half of the posterior root of

the trigeminal nerve and that this is, therefore, the "sensory arm" of the migraine cycle. In addition, he advanced the theory that the answer to the problem might be a hereditary tendency to an unstable hypothalamus relaying impulses, either from higher centers or some abnormal substance in the blood stream. This is possible since the large blood vessels are supplied with motor fibers from the efferent side of the autonomic nervous system. The work of Campbell and associates,¹⁶ who have shown the presence of abnormal amounts of blood sodium at the time of an attack, supports the "chemical change" theory.

These hypotheses are all interesting but, to date, we do not know why particular arteries in the cranium or, rarely, in other parts of the body should be so attacked, while the remainder of the arterial tree is unaffected.

However, one interesting fact concerning the etiology of this type of periodic headache has not received the prominence it deserves.

I have noted on a number of occasions that three factors precede the onset of migraine in susceptible adults.

The most common of these is pregnancy. This need not be the initial conception, and attacks can commence after the second or even the third child. In the migrainous patient, history may reveal biliousness in early childhood or adolescence. This condition clears up almost completely, and the patient is free from migraine until after the birth of the first child. One outstanding case was that of a woman doctor who suffered attacks of migraine approximately every six months when she was a student. She married after graduation and after the birth of her first child, the attacks increased to one each month and were associated with menstruation. After the birth of the second child, the attacks occurred weekly and, following the third child, one every thirty-six hours. Until she came under my care, she had only received injections of ergotamine tartrate and 100 mg. of Pethidine. Since such treatment was required with almost every attack, her life was almost intolerable. Fortunately, constructive preventive therapy relieved her condition to a large extent.

The second factor is the frequency with which these headaches occur after a severe infection, such as one of the acute specific fevers or other infective conditions, such as tuberculosis. One woman suffered from severe influenza during the 1919 epidemic. Before this time, she had had no symptoms of the migraine syndrome or other allergic diseases. Since that time, she has suf-

ferred severely from migraine and symptoms of other forms of endocrine imbalance. In at least 3 patients, migraine commenced after an acid-fast bacillus infection. I find these cases extremely difficult to treat and very resistant to all forms of therapy. Obviously, ACTH cannot be used or can tuberculin be exhibited to desensitize such patients.

The third factor is the syndrome of postconcussional migraine. I have known 6 patients who were involved in explosions prior to onset of the attacks.

These observations do not shed real light on the etiologic problem of the migraine syndrome, but they do point to the fact that it *must* be organic in basic origin.

DIAGNOSIS

In spite of the fact that migraine should not be difficult to diagnose, many patients have suffered for years from periodic headaches that were definitely in the migraine category but were incorrectly diagnosed.

Classical migraine is a unilateral headache preceded by a fortification spectrum or scotoma and followed by pain some twenty to forty minutes later. The headache is usually situated supra-orbitally with radiation to the temple area but often includes involvement of the cheek, nose, and neck. Photophobia is an almost invariable accompaniment, and nausea is an equally common symptom. The latter often terminates in vomiting, which may persist for forty-eight hours in very severe cases, sometimes at frequent intervals. This quartet of symptoms is the classical basic pattern. In addition, associated peripheral sensory changes are often present either in the form of "tingling" in the fingers or toes or a sensation of numbness extending perhaps to the knees or elbows. The tongue is often the seat of "pins and needles." Vertigo may accompany the headache, and many patients reveal a history of unilateral nasal congestion at the same time.

Although a migraine headache is considered unilateral, and usually is, it may commence on one side and then involve the contralateral and supra-orbital region, leaving the initial area free from pain after twenty-four hours. This is the really classical picture, but, in my opinion, migraine can be diagnosed provided the individual suffers from unilateral headache of a periodic nature combined with photophobia and/or nausea.

A number of morbid conditions may be confused with migraine by the uninitiated, but investigation readily proves whether or not the

disorder is caused by migraine or some other type of headache. In migraine, the patient is usually completely free from pain and feels perfectly well between attacks. However, some people claim their head never feels completely clear, but these patients are the exceptions.

The principal diseases to exclude when diagnosing migraine are:

1. *Hypertensive headache.* This pain is nearly always present on awakening and tends to decrease in severity as the day progresses, which is usually the reverse in the case of migraine. A blood pressure reading and examination of the urine will determine whether the individual is hypertensive or not. However, a point to remember is that migraine can occur both with and independently of raised blood pressure.

2. *Subdural hemorrhage.* In these cases, pain occurs suddenly and may cause confusion, since the initial migrainic attack might be responsible for the onset. But, the paralysis which nearly always accompanies such headaches, combined with other evidence of raised intracerebral pressure, should leave no doubt as to diagnosis.

In an article of this type, all the possible differential diagnoses are impossible to cover, and I propose to mention only one more — congenital cerebral aneurysms. While many claim that these aneurysms are the cause of migraine, I believe this is unlikely. I think their presence in the migrainous individual is probably a coincidence.

PROGNOSIS

In the past, prognosis for the migrainous patient has been gloomy. While ergot preparations were used in treatment at the end of the nineteenth century, there was no definite advance in relief of migraine until the exhibition of ergotamine tartrate in the early 1930's. These ergotamine preparations constrict the already dilated vessels and, although often successful, particularly when injected, do not provide a cure because another attack may occur as soon as their effect wears off. I have known patients who must inject themselves with ergotamine tartrate at eight hourly intervals in order to remain free from acute pain. Many people the world over receive daily injections in order to avoid pain and misery.

It has often been said that although the migraine patient must suffer for many years, he will be relieved when he reaches middle age. The underlying idea appears to be that with age the arterial wall tends to become arteriosclerotic and, hence, less apt to dilate. However, this is

not so in the majority of cases. In about 5,000 cases of migraine, I have noted that about 50 per cent of my patients are over 50 years old and a large number have passed the sixth decade. The oldest person I ever treated for migraine was a woman over 80, and she responded remarkably well. In a number of patients, the menopause brings relief, but this is surely because of the endocrine changes which dampen the abnormal impulses responsible for the initiation of the arterial dilatation. Therefore, in most women with these headaches, endocrine treatment is clearly indicated so that they will be relieved long before the climacteric is reached.

At any rate, it is cold comfort to inform a young girl suffering weekly from an acute, periodic headache that perhaps she will be better when she reaches the "change of life."

The ergotamine tartrate compounds in the form of Femergin or Gynergen should be known to all practitioners. Self-injection is easily taught if the patient is willing to learn. Sometimes it is difficult to obtain the patient's cooperation. However, frequent injections of this compound are not advisable, since possible side effects may occur and the basic underlying cause of the condition is not reached. Treatment with ergotamine is a confession of failure on the part of medicine, because it is in no sense basic or directed toward eradicating the cause of the disease.

It has often been said that when many drugs are used in the treatment of any disease, the chances are that none of them are very useful. Perhaps migraine is the exception to this rule, for, in the preventive therapy of periodic headache, the problem must be attacked from many angles. Therefore, the use of several compounds is not only indicated but is an essential part of the program.

It is reasonable to assume that many times migraine is due to impulses of an abnormal nature arising possibly in the pituitary and traveling via the hypothalamus along the anterior nerve roots of the autonomic nervous system to end-plates in the muscle walls of the arteries of the cerebral tree. Thus, it must be useful to attack the problem from the endocrine angle and attempt to prevent the onset of such abnormal impulses.

Again, since migraine is correctly considered an allergic type of disease, abnormally sensitive tissues must be present in the affected arteries which respond to some allergen. If it is possible to attack the problem from this angle, as it often

is, then it is clear that desensitization of the particular sensitive structure will provide an added chance of preventing the headache.

That, then, is the broad basis from which I have, over a period of seventeen years, endeavored to attack the problem of periodic headache. And in a high percentage of cases, success has been achieved either in preventing the onset of attacks entirely or in greatly lessening their severity. In the latter event, the headaches respond readily to the minor analgesic properties contained in such relatively bland "pain-killing" drugs as aspirin, phenacetin, and codeine.

In addition, several other compounds may be necessary to relieve the more intractable cases. No doubt some chemicals do prevent the onset of attacks in a few patients. Compounds such as urea and carbachol have been shown by some investigators^{17,18} to be efficacious. The series in which these practitioners used the drugs were far too small to be of the slightest significance as far as the general alleviation of periodic headache is concerned. On the other hand, I have discovered that urea is useful in about 1 per cent of migraine patients. And, when it does prove efficacious, the results are dramatic. Carbachol appears to provide some benefit in about 10 per cent of those with periodic headaches. One author stated that if an individual allegedly suffering from migraine did not respond to carbachol, the disease was not migraine. Nothing could be further from the truth.

The treatment of periodic headache can be divided broadly into two distinct categories: (1) those whose attacks are relatively mild and who can and should be treated by outpatient methods and (2) those with severe intractable headaches which occur more often than once every two weeks and who, at least initially, should have intensive inpatient treatment. If intensive therapy is not instituted when the attacks first occur, there is a real danger of "fixing" the migraine, and improvement is far more difficult to achieve later.

It is impossible to describe in detail all the methods of treatment, because each person requires individual and slightly different therapy. There is no reason why a physician should not use all of the treatments recommended, because none of them are harmful. However, in my opinion, this procedure is not very wise, and, certainly, to prescribe on a trial and error basis is completely unscientific.

I will describe as briefly as possible the type of therapy I use and which, over the years, has proved more satisfactory and relieved more se-

vere and intractable cases than any other that has yet been published. This has been proved by the fact that at the Migraine Clinic at the Putney Health Centre, London, we see patients who were previously referred to other neurological clinics in London who had failed to respond to treatment. Although, of course, we have our failures — and I consider they are far too numerous — nevertheless, the percentage of those showing definite relief is well over 80 out of every 100 patients.

TREATMENT

Before commencing treatment, I believe a comprehensive case history is essential. Not only does this allow the experienced practitioner to determine the type of migraine but also assures the patient that his case is being taken seriously. Periodic headache is as much a clinical entity as any other organic complaint and deserves an equally thorough investigation. The average migraine patient is often dismissed with a cursory physical examination and informed that, except for sedatives to ease the tension, combined with one of the ergotamine preparations when the attacks occur, little can be done. If he can be impressed with the fact that the practitioner is serious, the psychic side of therapy will be aided, although this alone never brings relief.

In order to be sure that no point is overlooked, I use a specially prepared case sheet for taking histories. In addition to all the matters noted thereon, it is essential to note the exact frequency and duration of the attacks as well as the severity of the pain and, if possible, the number of analgesic and ergotamine preparations that had been taken weekly prior to treatment.

A patient often returns saying that, although he is better, he is not much better. On referring to previous notes, the amount of pain-killers required is found to be so substantially less than when treatment was begun that the patient is really far more improved than he admits.

OUTPATIENT THERAPY

The limitations of intensive treatment are obvious, particularly in England where general practitioners are very busy under the National Health Scheme. No physician in general practice is able to attend to several migraine patients and give injections daily, twice daily, or even eight times daily. Therefore, if the patient is not in a position to undertake inpatient therapy, a very modified scheme must be adopted with the use of relatively few compounds.

To attack the problem from both the endo-

crine and allergic angles, the following regime is usually advised for both men or women:

1. *Injections of chorionic gonadotrophin (Pregnyl and Antuitrin-S)*. Start with 100 units and increase by 100 unit stages at three-day intervals until 500 units are being given twice weekly. Then 500 units are administered twice weekly for two weeks and weekly for eight weeks. If headache or ovarian pain is induced as the dosage rises, it must be discontinued at the highest tolerated dosage.

2. *Prostigmin desensitization*. For this purpose, 1 tablet (15 mg.) of Prostigmin bromide is dissolved in 1 oz. of aqua chloroformi. Starting with 1 drop of the mixture three times a day in water, the dose is increased by 1 drop per dose per day, that is, 2 drops three times a day on the second day, until a total of 50 drops is being taken three times a day. Then 50 drops are given only for two months. If exacerbation of symptoms occurs as the dose is augmented, the drug must be stopped at the highest tolerated dose. At times, headaches increase, giddiness ensues, or flatulence is present. All these side effects are rare but must be guarded against.

3. *Carbachol*. One-half tablet (1 mg.) is given three times a day for seven days, increasing thereafter to 1 tablet (2 mg.) three times a day. Later, up to 2 tablets may be given daily if tolerated and benefit accrues.

4. *Bellergal*. 1 tablet is taken three times daily.

Depending on the frequency with which the headaches occur, the patient is told to report again either in four weeks, eight weeks, or twelve weeks. When he reports, the case is reviewed and, if there has been definite improvement under the initial scheme, he is kept on the same regime for another three months, when he normally reports again. If no initial benefit is achieved, I believe that after a two-month trial, it is useless to persist with the endocrine and desensitization treatment.

The usual alternative consists of changing the hormonal therapy to that of:

1. *Pituitary whole gland*. One-half cubic centimeter is given twice weekly for one week, increasing to 1 cc. twice weekly the next week, followed by 2 cc. twice weekly for two weeks, provided no untoward reaction occurred as the dosage was increased. Then 2 cc. is given weekly for eight weeks. It is necessary to note the patient's reactions carefully, since, on rare occasions, headaches become worse temporarily.

2. Substitute for the carbachol 75 gr. of urea three times a day.

3. Substitute for the Bellergal 1 tablet of Micapron three times a day.

Either procedure usually proves beneficial to the migrainous individual. In some patients, headache ceases dramatically and, in others, improvement is gradual over a period of many months until the patients are so convinced that they are free from headaches that they no longer return to the clinic for review.

In a few cases, portions of the luteinizing and follicle-stimulating hormones are used in a combined form (Synapoidin). This can be tried when experience has shown that neither the chorionic gonadotrophin nor the pituitary whole gland are helpful. The compound I use consists of a mixture of chorionic gonadotrophin (luteinizing hormone) and the follicle-stimulating hormone (gonadal synergent) from the anterior pituitary. Treatment is as follows:

Five units (0.35 cc. of the mixture when Synapoidin is used) is given twice weekly for two weeks, followed by 10 units (0.6 cc. of the mixture) weekly for eight weeks. Again, care must be exercised to be sure that no undue ovarian stimulation is evidenced by pain within twenty-four hours after the injection. Should this happen, the therapy must be either omitted or the dosage reduced until no such reaction arises.

TREATMENT OF THE SEVERE CASE

There is no doubt that the severe case of migraine requires a far more intensive method of treatment to achieve and maintain good results than can be given by simple outpatient methods. This intensive therapy should be given when attacks occur at intervals of less than two weeks or occur at less frequent intervals but persist severely for three days or more. If the less complicated method is initially employed, the migraine may become "fixed." If the headaches are severe enough to warrant inpatient therapy later, it is less apt to be effective.

It is well known that the body can become resistant both to antibiotics and hormones and that, in the latter case, antihormones are induced. In the same way, desensitization with Prostigmin and infrequent dosages with hormones and vitamins may cause the soma to become more resistant to heavy dosages later on than if massive methods had been used at first.

Not until the medical profession in general realizes that migraine is a serious disease will the majority of people with this complaint be sufficiently convinced of its seriousness to be willing to undergo therapy for two to three weeks. A difficulty to contend with in the treatment of

these patients is that most of them feel so well between attacks. Therefore, they are often unwilling to spend the money and time which intensive therapy requires. I have little patience with this type of person and feel he has only himself to blame if his business and social life are limited because of frequent, painful attacks of periodic headache.

The intensive therapy mentioned is not difficult when the whole scheme is assimilated, but it is time-consuming even for the specialist. This is realized when dealing with compounds such as histamine which, though given in doses within the limits of the pharmacopoeia maximum, may prove very distressing to the patient. Thus, it is essential to inject small amounts of this compound at first and gradually increase the amount until a maximum toleration is achieved. In the same way, when administering decreasing amounts of ACTH, the physician must be continually on the alert for side effects, such as water retention or sugar in the urine or unpleasant psychologic effects. Because the course of intensive treatment is limited to two or, at the most, three weeks, no permanent ill effects can result from the administration of the adrenocorticotrophic hormone, such as may result from long-continued use. At any rate, the administration of potassium acetate three times daily soon causes a diuresis if the flow of urine is temporarily stopped.

In general, the intensive therapy which I use combines a number of compounds and the migraine is thus attacked from every possible standpoint. If the disease is viewed from a broad angle and treated with all known methods, the chance of success is far greater than if one compound is used.

The following is an outline of the course of treatment that I have evolved. Drugs are administered for the first time on the evening the patient is admitted to the nursing home.

1. *Histamine acid phosphate* is injected in a strength of 1 in 1,000 (1 mg. of histamine acid phosphate in 1 cc. of water). The first dose is usually 0.25 cc., unless the histamine skin test has shown that the patient is extremely sensitive. I have never seen such sensitivity in several thousand cases, though colleagues have told of the immediate vast swelling of the arm which was produced even by 0.01 cc. injected intracutaneously. The histamine acid phosphate dosage is increased by 0.1 cc. per dose daily until a maximum of 1.0 cc. three times a day has been reached. For three days during the first week, 0.2 cc. is given once every two hours for twelve

hours, and for three days in the second week, 0.1 cc. is administered every hour for six hours. I have found that this method of desensitization is equally as effective as that of the continuous intravenous drip, which is time-consuming and irritating to the patient who must remain in one position for several hours while the histamine solution is injected into the vein. In addition, intravenous methods, while probably safe in 999 cases out of 1,000, may have unfortunate results in the remaining case. Since migraine is never fatal, intravenous methods seem unjustified when equally good results can be obtained by frequent subcutaneous injection.

2. *Prostigmin desensitization* is also started on the first evening.

3. *Chorionic gonadotrophin injections* are started on the following day, and dosages of 100 units are given daily.

4. *Heavy-dosage vitamin B₂ therapy* is commenced early on the first full day of treatment, since insomnia may result if these doses are given in the evening. The dosage of the vitamins is a compound made as follows: aneurin hydrochloride, 100 mg.; nicotinamide, 160 mg.; pyridoxine, 50 mg.; calcium pantothenate, 5 mg.; and ascorbic acid 200 mg.

The foregoing is the dosage given daily for the first six days of treatment. After that time, the amount is increased to: aneurin hydrochloride, 250 mg.; nicotinamide, 160 mg.; pyridoxine, 50 mg.; calcium pantothenate, 5 mg.; and ascorbic acid, 200 mg. Riboflavin is injected separately in a dosage of 10 mg. daily for seven days and then increased to 10 mg. twice daily.

SPECIMEN DAY-TO-DAY REGIME

First day, evening — injection of 0.25 cc. of histamine acid phosphate, hereafter referred to as H.A.P.

Prescription for potassium acetate mixture is 2 gm. three times daily. For sleep, 1.5 gr. of Soneryl is administered or 3 gr. of Sodium Amytal, depending on the patient's need.

Second day, morning — injection of 0.3 cc. of H.A.P. Vitamin mixture as detailed, which will be referred to as Vit. Mist. I inject 0.5 cc. of 3 per cent Novocain before the Vit. Mist. in order to alleviate the pain that the latter may cause. Injection of 60 units of ACTH and 10 mg. of riboflavin. Check weight, urine, intake, and output.

Midday — injection of 0.3 cc. H.A.P. Auto-hemotherapy, 10 cc. of patient's own blood injected into buttock. Injection of vitamin B₁₂, 250 µg.

Evening — injection of 0.3 cc. of H.A.P. Injection of 100 units of chorionic gonadotrophin.

Third day. Injection of 0.2 cc. of H.A.P. every two hours for twelve hours.

Morning — injection of Vit. Mist., 60 units of ACTH gel, and 250 µg. of vitamin B₁₂.

Midday — injection of 10 mg. of riboflavin.

Evening — injection of chorionic gonadotrophin, 100 units.

The foregoing is the general regime which is continued for the fourteen days. The dosage of each compound depends upon the patient's reaction and in order to observe him constantly, hospitalization is essential. It is impossible to develop a scheme that will cover all cases, and each physician must work out his own method based on his own experiences.

From the foregoing, it can be observed that in my opinion, migraine is a disease having such a broad basis from an etiologic point of view that any one type of therapy is unlikely to succeed in all cases. For this reason, it must be reiterated how much more beneficial the treatment is if commenced from the central hormonal and the peripheral desensitizing angle, while at the same time raising the body's pain threshold with high-dosage vitamin B₂ complex and B₁₂.

The migrainous patient is not by any means always the easiest to handle. It is well known that a high percentage of persons with periodic headaches have an unstable parasympathetic nervous system. Therefore, in addition to the headache, they frequently show other signs of nervous imbalance. For example, while the patient is undergoing intensive therapy during his two weeks of hospitalization, he may become both elated and depressed at different times. Again, it is amazing how many people expect to have a condition relieved in ten to fourteen days when it has been present sometimes over fifty years. Relief is seldom experienced in such a short time. Often, many weeks, if not many months, are required before the full benefit of therapy is shown. A man who had suffered all his life underwent the intensive therapy at the age of 65, but he was not free from headaches for six months. On the other hand, a famous consulting surgeon, who gave himself daily injections of dihydroergotamine, spent the fourteen days of desensitization in a nursing home and returned directly to work without experiencing further migraine attacks. A nursing sister at a hospital in England required more than two and a half years before she was free of headaches. However, in a recent letter, she stated that she feels better than she can ever remember and that

her life has once again become worthwhile.

I never promise a favorable outcome, but I do impress upon patients the reasonable chance of success and the fact that I will do my best to rid them of their crippling, prostrating periodic attacks of headache. This attitude, apart from being fair, removes from the physician any possible accusation of bringing undue suggestion into the problem and thereby relieving the headaches by some mysterious psychologic method. Since numerous patients have been referred to me by workers at psychiatric clinics, it is clear that the psychiatrist's success in relieving the migraine syndrome is negligible.

Because no one method of attacking the migraine problem is apt to be successful and since the disease occurs frequently among all types of people, it is essential to establish migraine clinics in all large hospitals. Not until this is done will the average victim of periodic headache

obtain the treatment designed to relieve him.

Migraine is really much like diabetes except that the latter is a lethal disease if untreated, while migraine is merely prostrating and uncomfortable with no apparent physical signs. There are clinics for about every 2,000 diabetic patients in Great Britain and, thus, few cases remain untreated. Therefore, deaths from complicated diabetes are now negligible. When the migraine syndrome is considered sufficiently important to induce the authorities to establish special migraine clinics, not only will the victim be relieved of headache but the nation will also gain in working time.

I feel that in time this suggestion will be accepted. Now that we have a definite method of relieving 80 per cent and curing about 25 per cent of migraine patients, there is no excuse for permitting them to suffer from agonizing and far too frequent attacks of headache.

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Modern Technics for the Relief of Pain*

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UNUSUALLY GRATIFYING progress has been made in recent years in the relief of pain. There are many kinds of pain, of course, but the pain associated with surgical operations and obstetric delivery now can be managed more satisfactorily than ever before. The same is true of the pain occasioned by dental operations. Yet there are many occasions when the anesthesiologist, because of his daily use of pain-relieving drugs in relatively large doses, is consulted about the relief of another type of pain—chronic pain. Happily, he now has at his disposal a number of drugs that will accomplish his objectives. Moreover, in certain types of cases, he now has recourse to a method of diagnostic and therapeutic block¹⁻³ that only recently has been developed to a point at which it often will result in real satisfaction. These broad subjects, with ancillary problems necessarily involved, constitute the field of my discussion here.

DIAGNOSTIC AND THERAPEUTIC BLOCKS

Let us suppose that a patient had sustained an injury to his finger. Perhaps the finger was crushed in the door of an automobile. The shoulder-arm-hand syndrome develops—a white, shiny, swollen arm and hand that are so painful that the physiotherapist is unable to rehabilitate the arm. What could be done to help this patient? At one time diagnostic block with a local anesthetic agent might have been carried out on the stellate ganglion to see if such a procedure would provide relief. But that day is now past. Today the efficacious attack would be to carry out stellate ganglion block with alcohol, with the use of roentgenograms to be certain the point of the needle is in the correct site and in contact with the lateral edge of the first thoracic vertebra. First, the patient receives a small dose of some general anesthetic agent—usually Pentothal Sodium. Then 2 cc. or more of absolute alcohol is injected, 0.5 cc. at a time. The objective here is simply to wet the tissues about the end of the needle, to avoid injecting alcohol into other nerves that are not involved and should be

avoided. Next, two or three days after the block, the patient should undergo a sweating test to make sure that the block has adequately affected the sympathetic nerves. The sweating test is important because, if pain returns later, the test can be repeated, and if the pattern is the same as before, another block will not be indicated. On the other hand, if the pattern has faded, another block can be carried out, or, perhaps, even surgical sympathectomy may be advised. Surgical action is seldom needed, however, because the duration of an alcohol sympathectomy is extremely prolonged—sometimes as long as a year.

In still other cases, however, such as in the presence of certain atypical pain in the face, diagnostic stellate ganglion block⁴ can be used to ascertain whether the pain can or cannot be controlled by intervention in such a pain pathway. If the pain can be controlled by such a means, then it will be established that alcohol sympathectomy can be carried out successfully. Again, if the patient is going to go to some remote place where he cannot be attended by a physician, permanent sectioning of the sympathetic chain will be indicated.

Many patients can be benefited by chemical lumbar sympathectomy.⁵ This type of block also is carried out with the use of roentgenograms to indicate the placement of needles and with the establishment of a sweating pattern to indicate the completeness of the chemical sympathectomy. This block often is used to relieve pain and poor circulation in the lower extremity. It can be used as a speedy means of ascertaining whether sympathectomy will be effective enough, depending upon the condition of the vessels and how well they can respond. It has been employed also in association with the surgical treatment of stasis ulcers of the lower extremity, since, by enhancing the circulation to the maximum in such a case, it provides the greatest assurance that a skin graft will be successful.

A type of pain that may be most baffling is the persistent pain sometimes described by a patient who has been operated upon or who has sustained some sort of a tearing injury. For example, some patients complain bitterly of pain in

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the abdominal wall lateral to a laparotomy incision. At times, such pain can be relieved by block of the nerve roots at the eleventh and twelfth thoracic and first lumbar vertebral levels, and, if they are relieved, section of the sensory roots of these nerves can give permanent relief. Some women complain greatly of pain that persists after they have sustained tears from obstetrical forceps. Blocking of certain sacral nerves in such instances may produce relief and, if it does, sectioning of the sensory root also will do so. It is my feeling that when pain follows such trauma as I have mentioned, it may be that multiple neuromas have formed. If so, it may be impossible to remove them by resecting the old scar. What has to be done, then, is blocking of the whole sensory pain pathway, and such an action requires that the sensory root be sectioned. These cases are simply a few indications of the extent to which the anesthesiologist can employ diagnostic and therapeutic blocks to relieve pain far removed from that of surgical operations. A complete discussion would be much too long for the time available. Fortunately, papers and books about these methods are now being published increasingly, so that an abundance of information is readily available.

RELIEF OF CHRONIC PAIN WITH DRUGS

Relief of acute pain is not the problem that is posed by relief of chronic pain. Chronic pain may present a variety of challenges because of the wide spectrum which it embraces. For example, one extreme may be simply the administration of aspirin for a headache, whereas the opposite extreme might be the intramuscular injection of 10 cc. of a 10 per cent suspension of Dolitrone⁶⁻⁸ in 50 per cent polyethylene glycol. In each case, relief of pain is the objective, but, in the latter instance, it is amazing to find that such striking relief of pain can be produced without any other apparent effect of the drug. I can foresee that an injection of Dolitrone perhaps would be very valuable in the management of the walking wounded, either in military experience or in civilian disasters. We have not previously had an agent with the remarkable properties of Dolitrone.

In the treatment of acute pain, the physician is justified in using, of necessity, drugs that are known to be addicting. Yet, we are never free from the hope that some nonaddicting drug or combination of drugs will become available for people suffering from chronic pain. It is fortunate indeed, in this respect, that certain tranquilizing agents potentiate the action of other drugs.

For example, promethazine hydrochloride (Phenergan hydrochloride) or chlorpromazine hydrochloride (Thorazine hydrochloride) definitely exert a synergistic action when they are used with depressant drugs. This means that a twofold action can now be employed; first, such drugs as codeine or methadone hydrochloride can be potentiated with one of these new agents so that the amount of codeine or methadone hydrochloride required can be small; and second, sleep at night can be assured by the use of 25 mg. of Phenergan hydrochloride plus 500 mg. of ethchlorvynal (Placidyl) by mouth.

The management of a patient who has chronic pain involves twin objectives: relief of pain must be maintained in daytime, but sleep must be assured at night. If sleep at night is not provided, the physician almost certainly will be doomed to failure in trying to care for such a patient. Such a situation becomes very evident when thalamic pain develops after, perhaps, a brain hemorrhage. No drug will relieve the phantom pain unless the drug will affect the brain. For such patients, Phenergan hydrochloride and Placidyl help the patient to escape from his pain for hours and changes the picture considerably.

In my opinion, there is no justification for the use of meperidine hydrochloride (Demerol hydrochloride) for chronic pain, because this agent induces a type of addiction that is well known. Many agents constituted of variations of the chemical structure of Demerol hydrochloride have been produced, but one of them, heptacyclazine (WY-401), is said not to be addicting. Unfortunately, it is also not very effective unless aspirin is added to it and unless some Phenergan hydrochloride also is used, and even then it is not too effective if the pain is very severe. On the other hand, anileridine, which is a variation of Demerol hydrochloride, is extremely effective but it is also addicting. I am somewhat pessimistic about the future of Demerol hydrochloride and its variants, although it is possible that some antagonist will be developed that will neutralize the withdrawal symptoms caused by some of these drugs. It becomes apparent that the person addicted to Demerol hydrochloride (the action of which is of very short duration) does suffer greatly from withdrawal symptoms within a very short time after he takes the drug — sometimes as short a period as one and one-half hours — so that he continues to increase his dose. Some persons addicted to this agent take as much as 3,000 mg. a day, until they become seized with convulsions. Many of them attempt to suppress the withdrawal symptoms by resort

to a barbiturate, and then difficulties arise when the attempt is made to cure them of their addiction. Cure usually is attempted by substituting methadone for Demerol and then gradually eliminating methadone and, finally, withdrawing the barbiturate. In any event, the problem is a long-drawn-out one, and generally the patient is under psychiatric care for months, for, if this is not done, he will return to his previous habits.

When a patient is suffering from the terminal stages of a malignant process, the use of drugs such as morphine is justifiable. Yet, there are patients who are nauseated by the usual drugs used to control their pain, and the nausea must be brought under control. This can be done with different agents. Merezene in a dose of 50 mg. given intramuscularly often will control the nausea. Dimenhydrinate (Dramamine) can be used. Hyatrobol (consisting of hyoscine, atropine, and pentobarbital sodium) can be given by mouth. Phenergan hydrochloride given either by mouth or intramuscularly is effective against nausea and serves the double purpose, as I have said, of fortifying the effect of the analgesia.

Still other patients in the terminal stages of carcinoma suffer so intensely that it is very difficult to move them, so that if they wish to leave the hospital to go home, formidable problems arise. At times, patients of this type can hardly be managed by morphine alone. If, however, the morphine is contained in a 50 per cent solution of magnesium sulfate, success generally will follow the intramuscular injection of 2 cc. of the solution. The dose of morphine may have to be as large as $\frac{1}{2}$ gr. or more, but I have yet to see a patient whose pain cannot be rather well controlled with this combination. This technic, it is true, would not do for the relief of prolonged chronic pain, since the magnesium sulfate irritates muscles to some degree. On the other hand, 10 cc. of a 10 per cent suspension of Dolitrone, injected intramuscularly, could be used in association with the solution of magnesium sulfate and morphine, because the suspension of Dolitrone will produce almost two hours of relief from pain. Again, if 0.5 gm. of this suspension is administered intravenously to such a patient, it will provide four or five hours of fairly satisfactory relief, and the injection can be repeated. It should be noted, however, that the intravenous administration of the suspension of Dolitrone produces sleep to some degree, whereas the intramuscular use of the agent does not.

Actually, the foregoing instance constitutes a remarkable difference in the effect of a drug

when the method of administration is changed. Possibly, if we were to investigate some of the other drugs currently in use by administering them in different ways, it might be found that the effects could be varied. This might lead, in turn, to better ways of dealing with certain situations which now seem particularly difficult. Currently, the treatment of chronic pain has improved considerably over what it used to be, but we still do not have what might be called an ideal method for the control of chronic pain. Quite the contrary is true, however, in the matter of control of pain at the time of operation.

AN EFFICACIOUS COMBINATION

I shall not try to discuss the older anesthetic agents that have been used for so long, but I should like to mention the tendency in general toward use of preliminary medication, Pentothal Sodium given intravenously plus a muscle relaxant, and oxygen and nitrous oxide administered by inhalation, usually with an intratracheal tube. There are good reasons for this trend. The patient prefers the Pentothal Sodium, the work of the surgeon is improved by the effect of the muscle relaxant, and the anesthesiologist is eminently satisfied with the good airway, such as an intratracheal tube provides. Moreover, use of the gas machine means that the patient can be oxygenated adequately and that fireproof conditions will prevail. The most important point in this method, as in any other in which respiration is depressed, is that oxygen must be given generously.

An example typical of a satisfactory technic is one in which the anesthesiologist visits the patient the night before the operation, giving him at that time 25 mg. of Phenergan hydrochloride and 500 mg. of Placidyl by mouth. He then counsels the patient not to smoke until after the anesthesia shall have been dissipated the next day. Much difficulty can be avoided if this simple counsel is accepted, because patients often are nervous before the day of operation and smoke unduly the night before. If, after such an excess of smoking, they are taken to operation early in the morning after premedication, they may be unable to cough up secretions. It may even happen that respiratory obstruction will develop as a result of the retained secretions. If secretions, even though they are not solid, get into the intratracheal tube, they simply move up and down within the tube and do not allow good respiratory exchange. When such secretions are solidified, the tube actually may be obstructed.

On the morning of operation, the patient should be visited and asked how he slept. Most patients sleep well if they have received the medication I have mentioned. In fact, some sleep so soundly that they must be aroused in the morning. Others do not experience such an effect. The essential point here is that an appraisal is made of the result of the medication that was used the night before, prior to ordering medication preoperatively on the morning of operation. For the average patient, the medication used on the morning of operation consists of 25 mg. of Phenergan hydrochloride given intramuscularly, 2 mg. of levorphantratarate (Levo-Dromoran tartrate), and 1/150 gr. of atropine by hypodermic injection.

If the foregoing program has been used, the patients who come to the operating room ought to be in a tranquil state, and the Phenergan hydrochloride should increase the effect of the Pentothal Sodium. This means, in turn, that more caution must be used in the amount of Pentothal Sodium that is administered and also in the rapidity with which it is injected, after Phenergan hydrochloride has been administered.

On the other hand, if the only effect that is desired is a tranquilizing and not a synergistic effect, another tranquilizing agent, Equanil, can be used instead of Phenergan hydrochloride. This could be an important point for the anesthesiologist who is about to change his technic and follow what I have suggested, because it is very easy to overdose the patient with Pentothal Sodium.

RELAXANTS AND ANTAGONISTS

Anesthesia is induced intravenously with Pentothal Sodium in the operating room. To facilitate intubation, a small dose of solution of succinylcholine chloride (Anectine chloride or Quilicin) is administered intravenously. Sometimes, as little as 1 cc. or 20 mg. of the solution is sufficient. Large, robust men may require 2 cc. I prefer to give it in undiluted form. In about one-half minute to a minute, twitching of muscles becomes evident, produced by this drug. This takes place immediately prior to the onset of relaxation. By means of succinylcholine chloride, the larynx and trachea usually can be intubated without trauma, which is not the case when Pentothal Sodium is used in combination with curare. On the other hand, for the maintenance of muscular relaxation, I prefer to use curare. Hence, as soon as the tube is in place, I proceed from the use of succinylcholine chloride to that of the solution of curare. The reason for this is

that I have no sure antidote for succinylcholine chloride, whereas, if the need arises, I can neutralize the effect of the solution of curare with tensilon chloride. Currently, when so many drugs are readily available, a drug often can be found which will antagonize the effect of another.

A good example is seen in nalorphine hydrochloride (Nalline hydrochloride) used to antagonize the effect of an overdose of morphine. The uses to which this drug might be put are numerous. No doubt it will become a lifesaving agent in cases in which an overdose of morphine either has been given by accident or has been taken with suicidal intent, for it speedily vitiates the effect of morphine. The psychiatrists find Nalline hydrochloride useful in suspected addiction to morphine. If the patient has been taking morphine, and Nalline hydrochloride is administered, withdrawal symptoms appear within three to four minutes after the Nalline hydrochloride was given, so that the psychiatrist can then be sure that he is dealing with addiction.

Lorfan tartrate will bring about marked amelioration of the depression caused by morphine or a barbiturate, such as Pentothal Sodium and it does not have side effects, such as those of Nalline hydrochloride. The objection to Nalline hydrochloride is that if it is given to reverse the effects of morphine (when it is known that morphine was the narcotic used), it will be effective, but if the drug used to overdose is unknown and were a barbiturate, Nalline hydrochloride would augment the depression rather than relieve it. Lorfan tartrate does not have this effect.

Stimulant drugs are being used more and more to reduce the side effects of depressant drugs. For example, reserpine (Serpasil [Rauwolfia]) and Ritalin are already on the market. Ritalin stimulates the cerebral cortex and reserpine lowers the blood pressure. It was fortunate that this combination was developed, because reserpine brings about mental depression in some people, and Ritalin reduces this effect. Other drugs have been reported, such as megimide, which antagonize the effect of barbiturates. Megimide^{9,10} has been used in a number of cases in which a suicidal dose of barbiturates was taken and the administration of megimide for such a purpose has achieved a high percentage of success, particularly in the abatement of respiratory depression. A drug called "daptazole" (amiphenazole) has been used to antagonize the effect of morphine, particularly from the standpoint of respiratory depression. Mephentermine sulfate (Wyamine sulfate) has been suggested as a cerebral stimulant, which it definitely is.

ELECTIVE TERMINATION OF ANESTHESIA

On the basis of the known effects of these antagonists, it is my opinion that shortly we shall be able arbitrarily to terminate anesthesia produced with Pentothal Sodium, at least so far as the effect of respiratory depression is concerned. In time, we may be able actually to terminate this type of anesthesia at will, which would be a remarkable achievement indeed. The advantages are most provocative. The amount of nursing care required in the postanesthesia period very probably would be much reduced, and this undoubtedly would be true also of the time that the patient stays in the postanesthesia observation room. Termination of anesthesia at will, if it proved to be dependable, might permit the performance of more operations on outpatients and even in office practice. Such a development unquestionably would be of prime interest to dentists, because they already are using Pentothal Sodium for anesthesia in office practice and are sending their patients home subsequently. Actually, the resourcefulness and alertness of the modern pharmaceutical industry are such that once an idea has been described, too much time does not pass until the required agent is forthcoming.

THE NEED FOR OXYGEN

I should like to emphasize once again the need for oxygen and to say that when respiratory depressor drugs are used, it has been my experience that a flow of 8 liters of nitrous oxide and a flow of 2 liters of oxygen per minute into the breathing bag on the gas machine result in an arterial oxygen saturation of about 90 per cent or a little more. On the other hand, a flow of 7 liters of nitrous oxide and a flow of 3 liters of oxygen per minute result in an arterial oxygen saturation of 100 per cent.

I have also been rather concerned about the problem involved in the treatment of respiratory depression by means of controlled respiration; that is, intermittent compression of the breathing bag to obtain the effect desired. It is conceivable that this form of controlled respiration might cause sudden overventilation of the patient and bring about a marked change in the pH of the blood. The normal margin of change in the pH of the blood is so narrow as to invite the question of whether some of the reported deaths among anesthetized patients, inexplicable on the basis of findings at necropsy, might be associated with a marked change in the pH of the blood.^{11,12} I am much more confident about the status of the pH of the blood when the patient

breathes at least partially with his own physiologic mechanism, for if respirations happen to be shallow, I can administer as much oxygen as is indicated.

ANESTHESIA FOR CHILDREN

When tonsillectomy and adenoidectomy are to be done for children, 0.2 cc. of a 10 per cent solution of Pentothal Sodium per pound of body weight can be given rectally. Then, as soon as the child is asleep, 1 mg. of Phenergan hydrochloride per ten pounds of body weight can be injected intramuscularly and a small dose of atropine, 1/450 gr. or even less, also can be given. Then the patient can be brought to the operating room asleep. My practice is to administer nitrous oxide and oxygen with a few cubic centimeters of ether and to employ intubation so that anesthesia will not be interrupted by the operation or bleeding, since there is no interference with the airway. I find that when this technique is carried out, intubation can be established within four to ten minutes after inhalation anesthesia has been started. This is a decided advantage, because it means that the time the preliminary medication should be given and the time that anesthesia should be induced can be judged simply by a glance at the clock.

AMNESIA AND ANALGESIA

Thus far I have discussed a variety of ways of attacking these problems of pain. A new and most interesting development, which I have not mentioned, is the intravenous use of an anesthetic agent such as Pentothal Sodium or Dilitrone in small doses to produce amnesia. Amnesia can be of considerable value when block anesthesia is indicated, but the patient dislikes it or becomes hysterical because of the stress. Similarly, analgesia also can be produced with the use of an intravenous anesthetic agent, and it may be useful during the induction of block anesthesia.

NEUROGENIC SHOCK

For certain types of operations, such as tonsillectomy performed with the aid of local or infiltration anesthesia or intranasal surgery conducted under local anesthesia with the patient sitting in a dental chair, it may be very difficult if neurogenic shock develops from the stress of the circumstances. Blood pressure may fall. The patient may become white, wet, and nauseated and may even vomit. To help such patients, the blood pressure must be raised. This can be done with ephedrine given intravenously or Wyamine

sulfate administered intramuscularly or intravenously; on occasion, Ritalin has seemed to be helpful for the purpose in question. It is very interesting to see the response of a patient in such a condition to the intravenous administration of 100 mg. of compound F or lyophilized hydrocortisone (Solu-Cortef). Usually, within a minute after this agent has been injected, the patient feels very much better, and often the blood pressure rises. If the blood pressure does not rise, ephedrine can be employed. However, hydrocortisone is expensive, and, for that reason,

we have relied chiefly on the intramuscular administration of a relatively large dose of Wyamine sulfate at the time the preoperative medication is administered. If the dose of Wyamine sulfate is not sufficient, a second dose is given intravenously, and it has usually been effective.

I wish the time available would permit me to present additional illustrations, but I hope that those I have mentioned will indicate that today, as never before, we have at our command a most impressive array of agents and methods for use against the universal challenge of pain.

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Book Reviews on Pain

PAIN, by HAROLD G. WOLFF, M.D., and STEWART WOLF, M.D., professor of medicine (neurology), and associate professor of medicine, respectively, Cornell University Medical College, New York City, 1951. Springfield, Illinois: Charles C Thomas, first edition, revised third printing, 93 pages. \$2.50.

This volume has fewer than 100 pages, but it contains the essence of what one is concerned about in the problem of pain patterns. The first chapter deals with measurement of the threshold for the perception of pain. The second chapter describes pathways involved in conducting noxious impulses which are capable of inducing pain. Next comes a consideration of sensations allied to pain. The fourth chapter is devoted to the characteristics of pain regarded as a sensation, and it contains an analysis of deep pain, as well as additional observations on hyperalgesia and also central pain. The next chapter concerns pain arising from various bodily structures; this is followed by a chapter on pain from the various segmental levels. There is a chapter on the control, by means of drugs, of perception of and reaction to pain. A chapter sets forth surgical measures for the relief of pain, and another presents general principles in the management of pain.

There are a list of 125 references to papers on pain and an index. The last pages of the book contain line drawings which depict the front and back aspects of the

human body and show graphically the areas that are innervated by the main nerve supply.

This book contains much basic data of practical usefulness. It should be readily at hand for those who must deal with the amelioration of pain.

JOHN S. LUNDY, M.D.

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THE PRINCIPLES OF THORACIC ANAESTHESIA, PAST AND PRESENT, by WILLIAM MUSHIN, M.A. (Oxon.), M.B., B.S.(Lond.), M.R.C.S., F.F.A.R.C.S., D.A., director of anaesthetics, Welsh National School of Medicine; consultant anaesthetist, United Cardiff Hospitals; consultant adviser in anaesthetics, Welsh Regional Hospital Board; and L. RENDELL-BAKER, M.B., B.S.(Lond.), M.R.C.S., D.A., consultant anaesthetist, United Cardiff Hospitals and Welsh Regional Hospital Board; first assistant, department of anaesthetics, Cardiff, 1953. Springfield, Illinois: Charles C Thomas, 172 pages. \$9.50.

The authors write "That an anaesthetist needs to be a doctor and one well trained in the principles of anatomy, physiology and pharmacology, as well as of other sciences as applied to his art, is a belief by no means universally accepted. These qualities we believe are needed particularly when employing the techniques of anaesthesia used in thoracic surgery, for in these circumstances

the most fundamental mechanisms of life are upset. Yet to onlookers, and they have included not a few thoracic surgeons of international repute, anaesthesia for thoracic surgery nowadays looks absurdly easy, consisting apparently of little more than a rhythmic and monotonous squeezing of a bag. In fact, in more than one clinic abroad, a mechanical device takes the place of the human hand, the whole affair being looked after by a machine minder directed by the surgeon.

"By such apparently simple means, intrathoracic operations of the greatest complexity are carried out as a daily routine, and the risk of a fatal outcome during such an operation is probably little more than that during an abdominal operation of similar complexity. That this is so is largely, if not entirely, due to safe anaesthesia. It must be a source of wonder that for over fifty years the practical expression of principles on which the present-day techniques are based eluded men of the calibre of Matas and Sauerbruch. As recently as 1937 in a book on thoracic surgery, at the time regarded as authoritative, the method of anaesthesia described had not changed since it was put forward in 1908 by Tiegel."

A list of 217 illustrations precedes the introduction. Part one of the book deals with the problem of pneumothorax and its solution. In part 2, which gives the historic background, both the manual and mechanical methods of inflation are discussed. The historic background presented is most interesting and timely and makes this book of considerable value in respect to data on both old and new devices. One part of the appendix is devoted to biographic notes, with pictures of noteworthy figures in anaesthesia. An index completes the volume. This work is sure to be fascinating to anyone who is

interested in thoracic anaesthesia, and it will be particularly attractive to those who enjoy medical history. Since thoracic operations are quite impossible without such aids to anaesthesia as the intratracheal tube, and since more and more thoracic procedures are being carried out, those concerned with this field of surgery and the anaesthesia used with it should not overlook this volume.

JOHN S. LUNDY, M.D.

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STRESS AND DISEASE, by HAROLD G. WOLFF, M.D., professor of medicine (neurology), Cornell University Medical College; attending physician, New York Hospital, New York City, 1953. Springfield, Illinois: Charles C Thomas, 199 pages. \$5.50.

This work is in the nature of a small monograph in which the author endeavors to present and defend what is admitted to be a generalization about disease in man. The text itself is not entirely new, for much of it has been published in other sources. It is said that experimental evidence on which the convictions of the author are based has accrued from collaboration with many other workers. The original contributions of these men are listed in the bibliography.

It must be said that, for so slender a volume, the author has managed to gather together much knowledge about man, stress, and disease. A list of illustrations and a bibliography of 210 references, as well as an author index and a subject index, are included.

Such a book as this is provocative of much reflection in the midst of current living conditions in which the factor of stress is certainly increasing.

JOHN S. LUNDY, M.D.

Current Literature on Pain

FACTORS AFFECTING PAIN OF INJECTION, by JANET TRAVELL: J.A.M.A. 158:368-371, 1955.

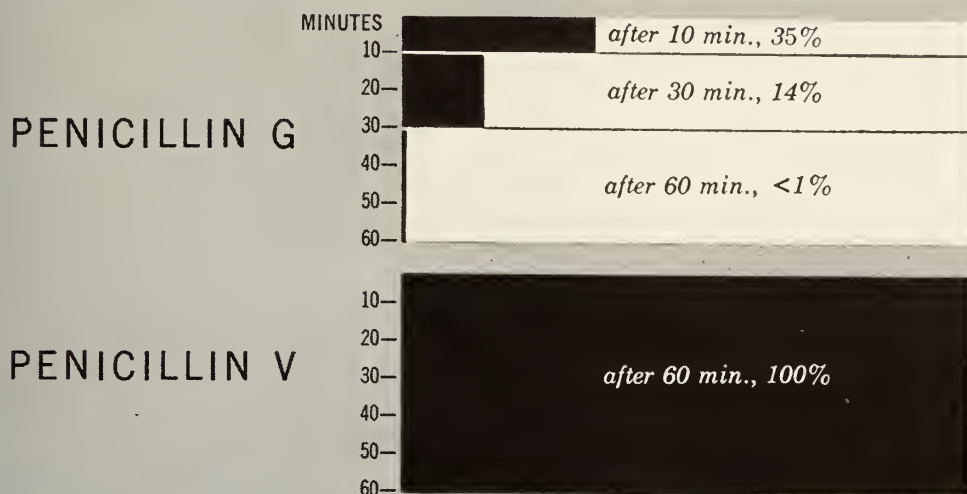
"This subject of pain from injections is one with which most adults have had intimate experience. On questioning a professional audience, I found that only one person in a hundred had never received a hypodermic injection of medicine, vaccine, or test material. Furthermore, of those who had had an injection, only about 10 per cent said they did not dread the next one. If persons were conditioned perfectly to the picture, there should be no unpleasant associations with it. But it is a sad commentary on current techniques of injection that so many persons have painful memories . . . At present the hypodermic possesses limitations in practical usage, concerning the depth of injection and the type and volume of material that can be administered. Also, bleeding and ecchymosis are apt to occur. A more convenient procedure to eliminate skin pain is the application of cold. . . . Years ago, I utilized cold to prevent skin pain by applying a cube of ice, on and off, during a few minutes. Later, I employed the technique of briefly spraying the skin with ethyl chloride just before inserting the needle, and for a long time I have used a refrigerant spray as a regular practice. Some of the halogenated hydrocarbon sprays have an advantage over ethyl chloride in not being flammable. . . . If the skin site is sprayed with a volatile coolant, and if a sharp needle is

neatly introduced into the vein, a minimum of pain results from puncturing the vessel wall . . .

"The normal muscle mass is practically insensitive to dry needling. Hypersensitive areas in muscles, however, are frequent . . . Trigger areas should be avoided in making intramuscular injections not only because of the immediate pain but because of a more serious problem that may arise if an injection into a latent trigger area activates it clinically and, thus, leads to a pain syndrome of severe 'sciatica' or other 'neuralgia' that lasts for months . . . When an irritant solution is injected into either normal or hypersensitive muscle, pain results. To minimize this, procaine or some other local anesthetic has occasionally been added to the parenteral solution. This procedure has been criticized as illogical, but we have found that it does reduce pain materially. The chief causes of delayed pain of injection include (1) infection, (2) aseptic irritation and necrosis, (3) antigenic reactions, (4) reactions to pyrogens, and (5) painful muscle spasm . . . By attention to specific details of technique, it is possible to render the routine injection of a nonirritant solution by the intradermal, subcutaneous, intramuscular, or intravenous routes virtually painless."

From LUNDY, J. S., and MCQUILLEN, FLORENCE A.: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1955, Vol. 42. Copyright by J. S. LUNDY.

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American College Health Association News . . .

We are happy to welcome two new members whose applications have been unanimously approved by the Executive Committee:

The University of Notre Dame, Notre Dame, Indiana. Representative: Dr. Joseph B. Crowley, director, Health Service. Alternate: Dr. Sherman L. Egan.

Grinnell College, Grinnell, Iowa. Representative: Evelyn Gardner, M.A., dean of women. Alternate: Mrs. Geneva Williams, R.N.

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The Pacific Coast Section of the A.C.H.A. held their annual meeting November 30 and December 1, 1956, at the Benjamin Franklin Hotel, Seattle Washington.

Charles A. Evans, M.D., University of Washington, acted as moderator for a panel: Immunization of Young Adult Populations.

Subjects included were:

"Current Status of Smallpox, Tetanus and Diphtheria Immunizations," Arthur P. Long, M.D., U.S.A. chief, Preventive medicine division, Sixth Army, San Francisco, California.

"Experience to Date with the Salk Vaccination Program at the University of Oregon Health Service," Fred N. Miller, M.D., director, Student Health Service, University of Oregon, Eugene.

"Influenza and APC Virus Immunizations: Present Status and Future Possibilities," William M. Kirby, M.D., professor of medicine, University of Washington.

"Frequency and Naturally Occurring Antibodies to Poliomyelitis Virus, and the Antibody Response to Salk Vaccine," Arthur W. Frisch, M.D., chairman, Department of Bacteriology, University of Oregon Medical School, Portland.

A summary by Dr. Evans and discussion from the floor followed.

A tour of the University of Washington Health Service was also included on the program and a fashion show was presented for wives of registrants.

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The annual meeting of the Southwest Section of the A.C.H.A. was held December 5 and 6, 1956, at Waco, Texas. Topics discussed included:

"Skin Conditions Seen in College Students," Dr. M. Allen Forbes, University of Texas.

"Report on the Nutrition Research Project for Teenagers Conducted at the Texas State College for Women," Dean Pauline Beery Mack, Texas State College for Women.

"The Importance, Determination and Use of College Student Attitudes Toward Health," Dr. Evelyn Kappes, Baylor University.

• • • • •

James J. Stewart, Jr., dean of student affairs at North Carolina State College, State College Station, Raleigh, N.C., is seeking a full-time director of Student Health Services. North Carolina State College is a technical institution with an enrollment of approximately 6,000 men.

Interested physicians should write to Dean Stewart, Office of Student Affairs, Holladay Hall, North Carolina State College, Raleigh, North Carolina.

Ralph I. Canuteson, M.D., director of the Health Service at the University of Kansas in Lawrence announces that their psychiatric staff has undergone some changes.

J. Willard Shankel, M.D., psychiatrist, recently from Creedmore Hospital, New York, joined the staff on July

(Continued on page 40A)



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1. Cass, I. J. and Frederik, W. S.: Malt Soup Extract as a Bowel Content Modifier in Geriatric Constipation. *Journal-Lancet*, 73:414 (Oct.) 1953.

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^{*}TRADEMARK



15, 1956, replacing Dr. Robert M. Edwards who had gone into private practice in Seattle. On October 15, 1956, William Binns, clinical psychologist, formerly with the Shawnee Guidance Clinic in Topeka, replaced Ben Lewis who had gone to California.

The first annual symposium, Psychiatric Division of College Health Services, American College Health Association, will be held Wednesday, April 24, 1957, at 2:00 P.M. in the Lord Baltimore Hotel, Baltimore, Maryland, preceding the thirty-fifth annual meeting of the association to be held April 25 through 27, 1957.

The program tentatively arranged is as follows:

Topic: Ethical Problems Encountered by College Psychiatric Services.

Panel Discussion: Saxton Pope, M.D., University of California, moderator.

Panel speakers will present fifteen-minute papers. Open discussion will follow after all papers are presented.

1. "Responsibility of the Psychiatric Service to the Family of the Patient." Speaker: Robert G. Hinckley, M.D., University of Minnesota.

2. "Responsibility of the Psychiatric Service to the Official Agencies (Police, FBI, Armed Forces)." Speaker: William I. Brill, M.D., University of Nebraska.

3. "Responsibility of the Psychiatric Service to Faculty and Administrative Personnel." Speaker: Bryant M. Wedge, M.D., Yale University.

4. "Responsibility of the Psychiatric Service to Other Campus Counseling Agencies." Speaker: John Summer-skill, Ph.D., Cornell University.

This first program has been arranged and sponsored by the present Committee on Mental Health of the A.C.H.A.

News Briefs . . .

North Dakota

DR. J. D. CRAVEN of Williston has been appointed county coroner by Williams County commissioners. Dr. Craven replaces George Everson who has held the post for four years. The appointment was brought about through a 1955 legislative law which requires the county coroner to be a medical doctor.

DR. WELDE W. FREY has resumed his practice in Drayton which was interrupted by two years of service with the Air Force.

IN THE OCTOBER 1956 issue of THE JOURNAL-LANCET, we stated that Dr. D. W. Nagle, who left Enderlin to

(Continued on page 42A)

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MANUEL E. LICHTENSTEIN, M.D.

Chicago, Illinois

SURGERY OF THE BILIARY PASSAGES is most frequently performed for symptomatic disease due to inflammation, obstruction, and tumors. Surgery has been recommended also for the patient with stones in a gallbladder that functions well without symptoms of gallbladder disease. The recognition and removal of the gallbladder with stones in those who can tolerate surgery will avoid the possibility of gallstone colic; symptomatic acute or chronic cholecystitis; hydrops, empyema, or gangrene of the gallbladder; perforation with diffuse or localized peritonitis; obstructive jaundice, cholangitis, hepatitis, biliary cirrhosis; gallstone ileus; pancreatitis; symptomatic cardiac irregularities; or carcinoma. When any of these complications or sequelae of gallbladder disease is present, operation appropriate to the nature of the local disturbance and the condition of the patient is indicated.

The patient who submits to surgery for removal of the gallbladder should be assured of recovery and freedom from the symptoms for which the operation is performed. This is the responsibility of the surgeon. The success or failure of this venture depends on 5 essential matters.

1. *Diagnosis.* The presence of stones in the gallbladder is not positive evidence that gallbladder disease is responsible for the patient's complaint. Neurologic, hematologic, arthritic, cardiac, pulmonary, or other abdominal condi-

tions may be responsible for symptoms that simulate those of gallbladder disease. Removal of the gallbladder without recognizing other diseases that are responsible for symptoms is not apt to bring relief.

The importance of the history in evaluating the patient's complaint or of a complete physical examination with the laboratory studies necessary to establish a more complete diagnosis should be emphasized.

2. *Adequate surgery.* Incomplete removal of a diseased gallbladder or retention of a large segment of the cystic duct may be responsible for recurrence of symptoms. Failure to explore a common duct containing stones which obstruct or to establish adequate patency of the ampulla due to stricture or an unrecognized carcinoma of the pancreas or adjacent viscera are reasons why symptoms persist or why new and more serious symptoms develop. Other significant and symptomatic conditions more remote from the biliary passages must not be overlooked.

The importance of abdominal exploration prior to removal of the gallbladder and of the visualization of the structures concerned in its removal must be stressed.

3. *Accidents.* Injuries to blood vessels, large or small, result in hemorrhage or liver necrosis; and injuries to the hepatic or common ducts, causing leakage of bile or obstructive jaundice, may be followed by prolonged disability or death.

The importance of recognizing the essential anatomy and of maintaining a positive effort to avoid an accident deserves emphasis.

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4. *Complications.* Respiratory, vascular, neurologic, and other complications incidental to anesthesia and faulty preoperative and postoperative management prevent complete recovery. The postoperative incisional hernia may be more troublesome than the gallbladder disease for which surgery was performed.

The importance of preoperative care, competent anesthesia and surgery, and effective postoperative management should be emphasized.

5. *Noncalculous gallbladder disease.* Patients in this group are notable for the poor results which frequently follow cholecystectomy. It has been estimated that less than 25 per cent are benefited by surgery. Thus, it is necessary to evaluate this group with a view to selecting for surgery those who are not relieved by appropriate medical management. Faulty eating habits and improper dietary selections must be corrected in some, while antispasmodics, antacids, bile salts, and sedatives must be given to others before relief from symptoms is obtained. Improved bowel habits, rest, relaxation, "peace and quiet" are helpful for all. A prolonged trial period of medical management will eliminate the large number in this group who are not apt to be helped by an operation. The remainder will require surgery. In this smaller group, unsuspected small stones, chronic gallbladder disease without stones, stenosis of the ampulla, chronic pancreatitis, or neoplasms may account for the patient's symptoms (figure 1). Such patients will be helped after appropriate surgery is done.

This group properly should be considered under diagnosis but, more importantly, emphasis is placed on the careful selection of cases for surgery, especially of those in whom obstruction of the cystic duct or stones in the gallbladder are not demonstrated.

THE OPERATIVE PROCEDURE

Abdominal wall incision. Anatomic factors related to the abdominal wall incision are its size and the degree of exposure it affords. The incision should be long enough to permit a wide exposure of the field. This will allow: (1) exploration of the neighboring abdominal viscera; (2) visualization of the anatomy concerned in the operation; and (3) manipulation necessary for removal of the gallbladder, probing of the ducts when necessary, and control of bleeding that may be due to accident or disease.

Whether the surgeon prefers the oblique, transverse, or longitudinal incision is not as important as the size of the incision. With satisfactory illumination of the field and gentle, careful retraction by an assistant who is aware of

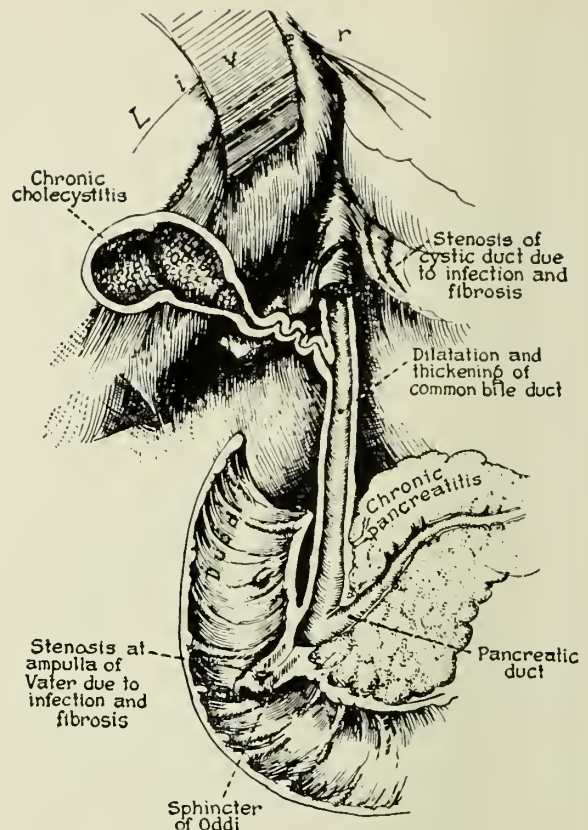


Fig. 1. Chronic infection and fibrotic constriction causing impaired drainage due to stenosis of the cystic duct or the sphincter of Oddi. (Reproduced with permission of D. J. Preston and the editor J.A.M.A.)

his responsibility not to injure the tissues, most of the accidents that occur can be prevented.

Incisions adapted to the contour of the abdomen take advantage of the good features of each and void the disadvantages (figure 2). Any avoidable disability is too high a price to pay for a small, inadequate visualization of the field.

Exploration. While injuries to the ducts and blood vessels frequently are caused by inadequate or faulty exposure, many patients fail to recover completely with relief from symptoms because of inadequate exploration. In spite of what is regarded as a complete preoperative examination, some intra-abdominal pathologic conditions which produce symptoms or which interfere with recovery are not detected before surgery. Roentgen studies, too, are not always revealing. However, when the abdomen is opened, a visual or palpatory exploration can be made to detect significant pathologic conditions which can be corrected immediately or which indicate the need for special postoperative medical care or further surgery (figure 3).

Exposure of blood vessels and ducts. Accidents involving blood vessels and ducts may be

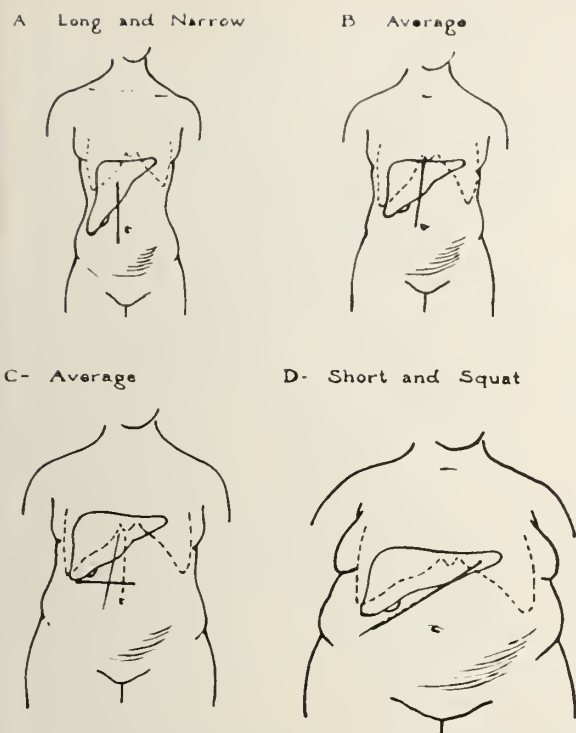


Fig. 2. Selection of an incision adapted to the shape and size of the torso provides a selective exposure. No one incision is universally applicable to all patients when adequate exposure is the purpose.

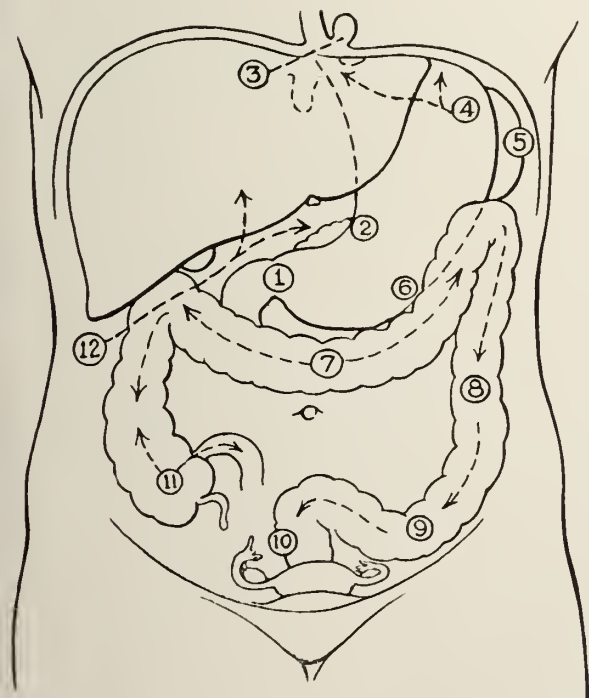


Fig. 3. Sequence of abdominal exploration to detect other conditions or disease concomitantly present in the abdomen. The gallbladder with stones may be asymptomatic. If this gallbladder is removed, persistent symptoms will result to which the term "post-cholecystectomy syndrome" is frequently but erroneously applied.

immediately fatal or result in prolonged disability before recovery takes place. In some patients, recurrent disabling episodes ultimately result in such changes in the liver that recovery is impossible. Thus, one small error may change a prospective good result into a failure, and a patient who might have enjoyed good health is committed to a long period of disability.

A distended gallbladder is an anatomic hazard. It obscures the ducts and vessels, interferes with exploration of the regional anatomy, and adds to the danger of its removal. The distended gallbladder should be aspirated of its fluid content and emptied of its stones. This aids in visualization of the field and avoids the forceful emptying of stones into the common duct. To facilitate further exposure of the ducts and vessels, the neck of the gallbladder is elevated, and the cholecystoduodenal ligament is opened. The peritoneal edges of this opening are carefully separated until exposure of the extraperitoneal space in which the major ducts and vessels lie is sufficient. Additional mobility of the gallbladder may be obtained by incising the serosa on its lateral aspect and elevating the neck of the gallbladder from its bed in the liver. The common, hepatic, and cystic ducts may now be inspected and the cystic artery or arteries isolated.

Bleeding from torn tiny vessels which obscures the field is controlled by the application of a warm moist pad with mild compression until the field is dry. This avoids the danger of accidents.

The blood vessels. Cystic arteries vary in number from 1 to 4. All of them should be ligated when it is established that they enter the gallbladder. In an obscure field, the closer vessels are ligated to the gallbladder, the less the risk that hepatic vessels will be injured or occluded.

The gallbladder is held to the liver not only by its serosal covering, which is continuous with Glisson's capsule, but also by a cystic artery. This is demonstrated by the ease with which the gallbladder is removed after the cystic artery is severed. During surgery, lateral traction on the neck of the gallbladder causes the cystic artery to become taut. It can now be palpated as a "wire" and thus identified. It is usually in association with a lymph node which may obscure the view. Unless care is taken, the vessel may be torn or mistaken for a fibrous band and cut. This can be avoided by ligating the cystic artery soon after its exposure and severing it close to the gallbladder. This permits greater mobility of the neck and cystic duct with less risk of hemorrhage and a better view of the larger ducts.

The cystic artery or arteries may arise from any branch of the celiac axis of the aorta, the

superior mesenteric artery, or the aorta itself. While the cystic artery comes most often from the right hepatic artery, its origin from a large vessel at some distance from the gallbladder may subject it to injury during the act of retraction of the viscera adjacent to the gallbladder. This further emphasizes the need for care in the initial phase of cholecystectomy when the viscera are exposed and the field is opened to view. Medial and inferior displacement of the duodenum with retraction by a hand or instrument may compress a torn vessel arising from the superior mesenteric artery and prevent bleeding. After the retractor is removed, the operative field may fill with blood and prolong the procedure, or bleeding may follow closure of the abdominal wall in the early postoperative period and result in shock.

There is a particular danger when a vessel is cut or torn and retracts out of view in the field. The accumulation of blood obscures ducts and vessels, and an impulsive application of a forceps in this field in an effort to control bleeding is a frequent cause of injury to these structures.

By inserting the left index finger into the foramen of Winslow, the hepatic artery can be compressed with the left thumb in the many patients whose structural arrangement permits this to be done (figure 4). The blood can now be aspirated and the field irrigated with isotonic salt solution. Removal of this fluid by suction clears the field. The surgeon can then see the extent of injury and secure the bleeding point.

The ducts. The length of the cystic duct varies considerably. The extremely short ones are less than a centimeter in length and favor injury to the hepatic and common ducts. The mildest traction on a gallbladder with a short duct favors "tenting" of the other ducts, so that the application of a clamp occludes more than the cystic duct. Other cystic ducts are as long as the gallbladder itself. Frequently, a long cystic duct and the hepatic duct lie side by side for one, several, or many centimeters before they unite to form a common duct. It is less hazardous for the patient to have the contiguous portion of the cystic duct remain, for complete excision of a cystic duct attached to the hepatic duct may be more injurious to the long hepatic duct, duodenum, or pancreas.

It is better to avoid clamping the cystic duct in almost all instances. The duct can be exposed more readily with careful, blunt dissection, using a fine tipped Mixter forceps or any of its modifications and applying a ligature directly to the cystic duct at right angles to its axis in full view of the common and hepatic ducts.

The cystic duct usually has the narrowest cali-

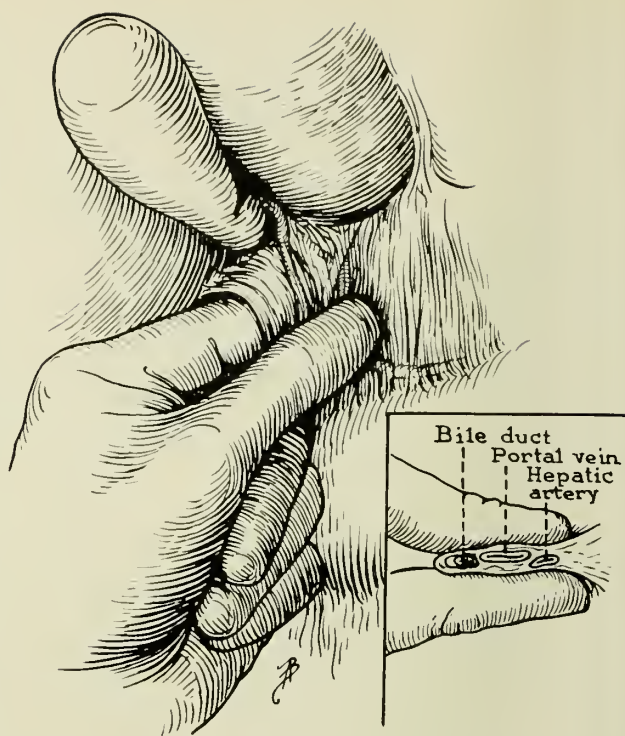


Fig. 4. Method for the control of bleeding from a branch of the hepatic artery when this vessel lies in the free edge of the lesser omentum.

ber of all the extrahepatic ducts, and its surface is "corrugated" or irregular because of small, leaf-like projections within its lumen that extend in a spiral throughout short ducts. These are the valves of Heister, an embryologic formation usually not found in the distal end of long cystic ducts. These characteristics of the cystic duct are useful in establishing its identity on sight.

Variations in the mode of union of the hepatic with the cystic duct to form the common duct, the occasional union of the cystic with the right hepatic duct, and the right hepatic duct's rare entrance into the gallbladder warrant careful inspection before any duct is ligated and cut.

The location of the hepatic duct is constant. It lies at the bottom of the quadrate lobe of the liver. This lobe is bounded by the gallbladder fossa on the right, the round ligament on the left, the anterior margin of the liver superiorly, and the hilus, where the larger vessels enter and the hepatic ducts leave the liver. If this fact were more generally known, serious injuries to the hepatic duct could be avoided. The duct lies behind a layer of peritoneum. The thickness of this peritoneal layer varies with the degree of chronic peritonitis associated with the biliary tract disease. Immediate exposure of the quadrate lobe by traction on the round ligament toward the left and displacement of the body of

the emptied gallbladder to the right help to visualize the danger zone in biliary tract surgery (figure 5).

Pathologic factors determine the need for exploration of the common duct. Indications are:

1. Palpable stone or stones.
2. Dilated duct — distal obstruction.
3. History of jaundice or chills and fever.
4. Thickened duct (chronic cholangitis).
5. Contracted gallbladder (stones already evacuated into common duct).
6. Large caliber cystic duct with many stones and biliary "mud" in the gallbladder (stones and "mud" in the common duct too).
7. Palpable tumor in the duodenum at the ampulla (duodenotomy indicated).
8. Gastric surgery — duodenal lesion encroaching on the common duct.
9. Chronic pancreatitis — stricture or compression of the common duct at the ampulla or in the intrapancreatic portion.
10. Postcholecystectomy. Cholangitis, pancreatitis, hepatitis, biliary cirrhosis, jaundice (in the absence of other causes for the clinical symptoms and findings), persistent biliary fistula, persistent epigastric pain, weight loss with or without chills, fever, or jaundice.

As a safeguard in exploration, aspiration of bile is an assurance that the portal vein has not been mistaken for the duct. Mobilization of the duodenum by incision of the parietal peritoneum on its lateral margin and caudad displacement of

the hepatic flexure of the colon facilitate manipulation necessary to explore the duct, expose the ampulla of Vater, or repair injured ducts.

Aberrant ducts are occasionally seen and when not involved in the removal of the gallbladder should remain undisturbed. More often, they are not recognized and may be injured during cholecystectomy. Fortunately, few of the ducts drain sufficient bile to cause serious postoperative complications. However, they account for some cases of bile peritonitis.

Abdominal "drainage." Bile leaking from the wound after surgery may be caused by injury to an accessory duct rather than to improper ligation of the cystic duct. This can occur even in the simplest case when the liver is partially rotated out of the abdomen and a short accessory duct is torn off. The hazard of injury to an accessory duct without knowledge that it has been torn or evulsed is present in every case.

Some of these ducts are narrow in caliber and may be injured during cholecystectomy. Subsequently, a large amount of bile may accumulate in the subphrenic or subhepatic spaces.

Careful closure of the gallbladder bed in the liver by suture of the "flaps" of the serosa and the subserosa in the liver bed helps to occlude vessels and ducts in this raw surface and assures a dry field.

Some surgeons of wide experience and good judgment do not use drains as routine practice after cholecystectomy and state that they have no cause to regret this omission. However, many others are convinced that it is better to insert a drain and risk a useless application with a good result than to omit it and risk a subphrenic accumulation of bile, blood, or peritoneal fluid.

A drain should not be a substitute for careful surgery. Hemostasis, the closure of openings in ducts, and the suture of leaking bile channels lying in the gallbladder bed of the liver prevent the accumulation of blood and bile in the subhepatic space. A hernia practically never results when the drain leaves through a stab wound on the right side below the costal margin.

Abdominal wall closure. A common hazard in gallbladder surgery is the development of a postoperative incisional hernia. This may be due to faulty healing from one or several of a variety of causes or to malocclusion of the layers of the abdominal wall. While the causes of faulty healing are well known and can be guarded against by proper nutrition, prevention of infection, and avoidance of distracting forces on the suture line, the anatomic factor of complete and accurate closure of the posterior sheath of the rectus muscle with its transversus muscle, transversalis

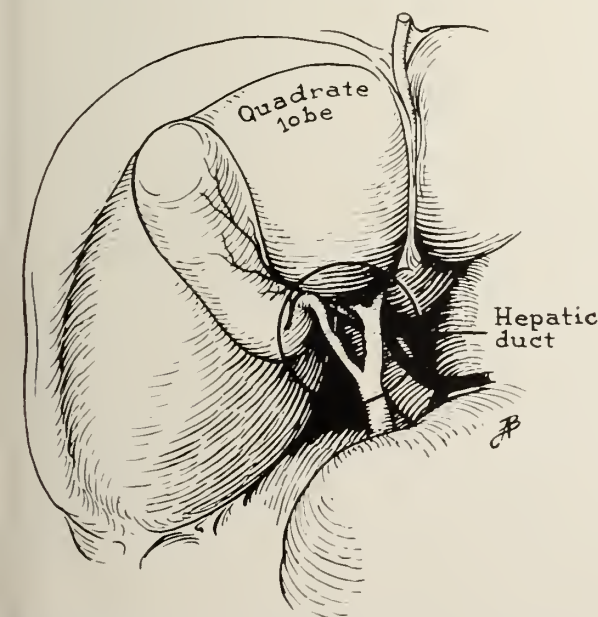


Fig. 5. Quadrate lobe and location of hepatic duct. In 88 per cent of patients, the duct emerges from the posterior extremity of the quadrate lobe. In 12 per cent, ducts emerge along margin of the lobe, sometimes close to the fossa of the gallbladder (Anson).

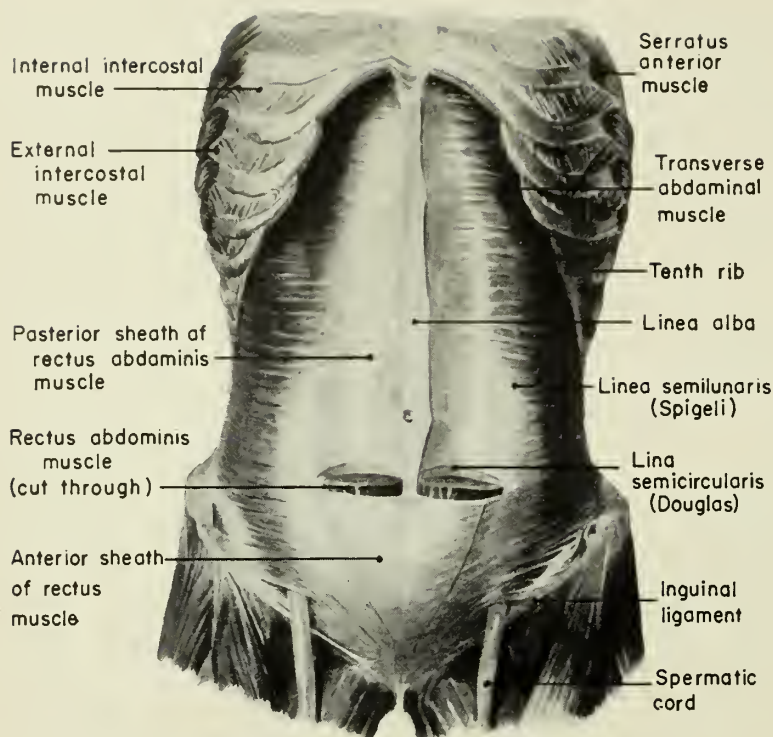


Fig. 6. The transversus muscle and the posterior sheath of the rectus muscle. Failure to suture securely this layer is responsible for postoperative herniation. Muscular relaxation is necessary to approximate the cut edges, since muscle contraction draws the lateral cut edge behind the rectus muscle and prevents approximation of the cut edges.

fascia, and attached peritoneum needs constant emphasis (figure 6). Failure to suture accurately this important layer is frequently the fault of inadequate abdominal wall relaxation.

In some instances when the abdominal wall is thin, the transverse parallel fibers of the transversus muscle and its aponeurosis split apart during closure of this layer. This defective closure may be avoided by correct placement of the closing suture. A lock stitch pulled snugly at right angles to the transverse parallel fibers, while the edges of the wound are pushed toward the suture, will approximate bundles of fibers and maintain a snug closure.

Attention to the details of closure is well worth whatever additional time is required to restore the integrity of the abdominal wall. Suture materials should hold the tissues in approximation until healing is well established. Nonabsorbable sutures for fascial closures are best.

Anesthesia in an amount sufficient to relax the abdominal musculature is needed, and closure of the incised wound should not be attempted until this is established. At this stage, some anesthesiologists use muscle-relaxing agents to facilitate the closure. These agents are useful, but the hazard of decreased respiratory excursion and anoxia warrants constant vigilance to be sure that the patient can breathe well in the immediate postoperative period. A clear airway, with adequate oxygenation of the blood by artificial pul-

monary ventilation, is a requirement until the patient regains control of respiration and is out of danger.

SUMMARY

Surgery of the biliary passages has attained a high state of refinement. Results are excellent in most patients with biliary tract disease.

Hazards in surgery of the biliary tract are present from the moment the initial incision is made until the last suture is placed. Pathologic changes and variations in anatomy contribute to these dangers. The location and size of the abdominal wall incision are factors that determine the ease with which surgery on the biliary passages may be accomplished. The importance of abdominal exploration to determine the presence of coincidental pathologic conditions is emphasized. In a well-exposed and illuminated field, all structures may be visualized and the risk of injury to vessels and ducts is minimized. The importance of the quadrate lobe is emphasized.

There is no substitute for care and skill. It is better to take time to perform the operation well than to hurry and risk an accident. Secure closure of the abdominal wall to prevent herniation is an essential part of the procedure.

"Postcholecystectomy syndrome" includes a variety of conditions that have been specifically described. It is not an entity and should not be referred to as such in the surgical literature.

Solitary Cyst of the Spleen Associated with Hypersplenism

Report of a Case

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THIS REPORT CONCERNS a middle-aged man who had a large, solitary calcified cyst of the spleen associated with mild depression of white blood cells and platelets with persistent anemia.

The first case of a solitary cyst of the spleen was reported by Andral¹ in 1829 in an autopsy report. Until recently, splenic cysts were thought to be quite rare. During a thirty-year period ending in 1934, Pemberton² found 4 cysts in 800 splenectomies at the Mayo Clinic. Tamaki,³ in reviewing the files of Jefferson Medical College Hospital, found no record of splenic cysts. Deenen⁴ discovered only 8 cases in the files of Bellevue Hospital in New York City between 1915 and 1948. Fowler⁵ found 137 cases up to 1940, and Callahan and Shellito⁶ listed a total of 184 cases in the world's literature that had occurred before December 1951. Fowler,⁷ however, uncovered 265 cases in foreign and domestic literature up to May 1952.

Cysts of the spleen have been classified according to contents, etiology, pathology, and morphology. The most frequently referred to classification is that of Fowler⁵ whose original grouping was divided into primary and secondary cysts. Primary cysts included 21 per cent of his original group and were divided into the following categories: congenital (formed by infoliation or ectasis), traumatic, inflammatory, neoplastic (dermoid, epidermoid, lymphangioma, and cavernous angioma), and parasitic (echinococcal). His secondary cysts included 79 per cent of his group and were divided into traumatic, degenerative, and inflammatory cysts. He later added a morphologic grouping to this etiologic classification. These included: (1) large, single, and subcapsular cysts (hemorrhagic and

serous); (2) large, multiple, communicating, deep-multilocular, and fused cysts; (3) large, multiple, noncommunicating cysts with small satellites (hemangiomas); and (4) small, single or multiple, and superficial or deep cysts (serous).

The most common splenic cysts are the large solitary hemorrhagic cysts. Trauma apparently plays an important role in their development. McClure and Altemeier⁸ describe them as encysted hematomas caused by splenic injury which fails to lacerate the surface of the organ but tears the vessels within the spleen with consequent hemorrhage. They further state that spontaneous hemorrhage may occur. This hemorrhage, in turn, results in cyst formation with walling off by fibrous tissue. Absorption of blood may transform these hemorrhagic cysts into a serous type.

The first case report of hypersplenism was published in 1942 by Wiseman and Doan⁹ who reported a new syndrome closely related to congenital hemolytic icterus and essential thrombocytopenic purpura. This syndrome consisted of (1) a decreased number of circulating neutrophils, (2) an enlarged spleen, and (3) bone marrow which appeared normal in its ability to produce this type of cell. It was called primary splenic neutropenia. Since that time, Dameshek and Miller,¹⁰ Fullerton and Dugid,¹¹ Hirschboeck,¹² Stickney and Heck,¹³ Doan and Wright,¹⁴ Langston and associates,¹⁵ Moore and Bierbaum,¹⁶ Palumbo,¹⁷ Kinsey and Bingham,¹⁸ Schatken,¹⁹ and others have reported cases or added to the knowledge of this subject. These reports also included normal and abnormal splenic physiology, and, since it is fundamental to the understanding of this subject, we will again review the physiologic structure of the spleen.

The spleen is one of the large organs of the body, weighing 125 to 150 gm. at necropsy; and, because of its action as a reservoir, may be considerably larger during life. Many fibrous trabeculae traverse the splenic substance from the

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thick capsule which lines the spleen. Unlike most organ coverings, the splenic capsule contains a large amount of smooth muscle which, under the innervation of the sympathetic nervous system, is able to contract and relax. Hemorrhage, anoxia, excitement, and exercise can all cause contraction of the spleen. The spleen apparently has a closed circulation, and after blood enters the spleen, it flows quite sluggishly through a complex system of arteries, venous sinusoids, and veins. While the blood flows slowly through the splenic pulp, it comes into contact with the cellular contents of the spleen which may have a phagocytic action upon it. Dameshek and Estren²⁰ point out that the spleen has 3 major functions: (1) regulates the bone marrow, governing the production and delivery of red and white blood cells, and platelets; (2) acts as a reservoir, making red cells thicker through erythrostasis and, therefore, more vulnerable to destruction; and (3) aids phagocytosis, including the destruction of aged red cells. They believe that hypersplenism is the result of inhibitory effects of the spleen upon the marrow. If splenic hormones act on the bone marrow to inhibit the maturation of megakaryocytes, splenic thrombocytopenia (idiopathic thrombocytopenic purpura) may occur. In the same way, splenic neutropenia or splenic pancytopenia may result, and their association with hemolytic anemia depends on whether or not there is an exaggeration of phagocytic action of the spleen, which is directed almost entirely toward red cells.

Wiseman and Doan⁹ suggest that the pathogenesis of hypersplenism is dependent, at least in part, on the phagocytosis of cellular elements in the spleen. Normally, there is a balance between destruction and production, and destruction includes only those cells which are old and worn out. In hypersplenism, there is a pathologic increase in the cellular destructive power of the spleen. It loses its physiologic selectivity with resultant hyperphagocytosis of probably pathologically altered or modified hematologic cellular elements. The clinical syndromes arising vary, depending upon which blood-cell types are destroyed. The spleen can withhold and destroy any of the hematologic cellular elements, resulting in anemia, leukopenia, thrombocytopenia, or panhematopenia. In such cases, the bone marrow tries to compensate by an overproduction of cells, which causes a hyperplastic marrow.

CASE REPORT

S. B., a 48-year-old farmer who had always resided in North Dakota, was first seen August 4, 1954, with the chief complaint of chronic fatigue for fifteen years. This was characterized by weakness and loss of normal

strength and vitality. The patient also had progressive loss of vision for fifteen years.

Fifteen to twenty years ago, he tried to scale a board fence and fell lengthwise on a plank which struck him across the left upper abdomen and chest. Twelve to fourteen years ago, he experienced an episode of jaundice. No details are known.

Physical examination. The patient appeared well-developed and well-nourished with pronounced pallor and deliberate movements. Temperature was 98, pulse 72, and respiration 18. Weight was 182.5 lb., height 67½ in., and blood pressure 140/90. Eyes showed almost complete blindness. Pupils were round, regular and equal, and reacted well to light. Sclerae were clear. Funduscopic examination revealed a few pale disks with narrow retinal vessels. A movable paratracheal node was present on the right side about 2 cm. in diameter. The heart and lungs were physiologic. The liver border was palpable on inspiration. The spleen and kidneys were not felt. No masses and no tenderness were found. There were internal and external hemorrhoids and a two-plus enlargement of the prostate.

Laboratory studies. At the time of the original examination, the red blood count was 3,980,000; hemoglobin was 7.4 gm.; and the white blood count was 5,560 with a differential count of 35 per cent polymorphonuclear leukocytes, 50 per cent lymphocytes, 10 per cent eosinophils, 4 per cent monocytes, and 1 per cent basophils. The red cells were hypochromic and microcytic with pronounced anisocytosis and poikilocytosis. Urinalysis was negative. The electrocardiographic tracing was within normal limits. Because the patient had a 10 per cent eosinophilia associated with an abdominal calcified mass, which was discovered on roentgen examination, serum was sent to the Communicable Disease Center at Chamblee, Georgia, for a complement fixation test for echinococcus which was reported negative.

The admission blood count at Jamestown Hospital at Jamestown, North Dakota, on December 15, 1954, showed a red cell count of 3,150,000 with hemoglobin of 8.85 gm. and a white cell count of 8,800. The platelet count was 195,000. Bone marrow aspiration showed normal cellular elements. Urinalysis was negative. Prothrombin time was 35 seconds or 43 per cent of normal. Stool for occult blood was negative. Reticulocyte count was 1.3 per cent.

Roentgen examination. Chest plate disclosed a rounded shell of calcium underlying the left dome of the diaphragm, which measured about 7 cm. in diameter. Examination of the abdomen again demonstrated the abnormality. The renal shadows were normal, and the calcific density was well away from the left kidney shadow. Fluoroscopy revealed that this density impressed the greater curvature of the stomach but did not displace the stomach. It also appeared to be freely movable with respiration.

Fischl and Papps²¹ suggest that a fixed left diaphragm and diminished breath sounds are characteristic of splenic cysts. These findings were not present in this patient. They also suggest that on fluoroscopy, displacement of the diaphragm, stomach, splenic flexure, and transverse colon may be expected, with the barium-filled stomach displaced to the right and the colon pushed down and to the right. Furthermore, the left kidney may be displaced downward. While fluoroscopy showed that our cyst impressed the greater curvature of the stomach, it did not displace the stomach. And, as previously mentioned, the renal shadows were normal, and the diaphragm was not displaced. Benton²² feels that the down-

ward displacement of the splenic flexure is almost pathognomonic of large cysts of the spleen. However, this could not be demonstrated in this patient, since colon fluoroscopy was not performed.

Operation. On December 17, 1954, after a transfusion of 2 units of blood, the patient was taken to surgery. The abdomen was entered through a left abdominal thoracic incision under general anesthesia. A freely movable spleen was easily delivered. After clamping the pedicle, the spleen was removed. The pedicle was tied off with multiple ligatures. Airtight, intercostal drainage was instituted after closure of the diaphragm and chest wall. During the procedure, 2 additional units of blood were given.

Pathology. Specimen consisted of spleen measuring 15 by 12 by 4.5 cm., weighing 225 gm. without cyst contents. There was a large spherical subcapsular calcified cyst measuring 6 cm. in diameter, the wall measuring 3 mm. in thickness. The inner lining was white and smooth and the wall was completely calcified. The cyst occupied the lateral border of the spleen, and was situated just superior to the splenic notch. The cut surface of the spleen was not remarkable. The sample fluid from the cyst contents was tan and contained whitish, flocculent material.

Sections through the spleen showed prominent malpighian corpuscles with germinal center formations. A number of these had annular rings of dark zones of mature lymphocytes about the germinal centers and were surrounded by prominent marginal zones as pointed out by Leffler.²³ The cyst wall was made up of fibrous tissue with hyalinization and extensive calcification. No demonstrable lining cells were noted. Microscopic examination of fluid samples showed albuminous coaguli and no cellular elements. Echinococcus hooklets were not apparent. Hyalinization with calcification of cyst wall and absence of lining cells made specific classification impossible.

The postoperative course was stormy. The patient became febrile and almost comatose. A large quantity of involuntary liquid stool was passed. On the fourth postoperative day, a Micrococcus catarrh was isolated from a stool culture. The patient was placed on antibiotic therapy and responded well. He was discharged on January 1, 1955.

On January 12, 1955, his hemoglobin was 12.6 gm., and his white blood count was 10,000. On January 31, 1955, his hemoglobin was 92 per cent or 14.2 gm., with a red blood count of 5,190,000 and a white blood count of 10,550. The erythrocyte morphology now appeared normochromic and normocytic. The patient stated that he felt better than he could previously remember.

DISCUSSION

It is interesting to note that although the only blood the patient received pertained immediately to surgery, his blood continued to climb postoperatively until normal levels were reached. Because the values of all the hematologic cellular elements were increased after surgery, it appears that they were all involved, with the red cells showing the greatest change.

The cardinal features of hypersplenism as sug-

gested by Kracke²⁴—enlarged spleen, cytopenia, hyperfunctioning bone marrow, and splenic overactivity by epinephrine test—were partially present in our patient. Although the spleen was not clinically palpable, it was approximately twice its normal weight. Cytopenia was unquestionably present, but no evidence of a hyperplastic marrow was found. Unfortunately, no testing was done for splenic overactivity by the epinephrine method.

Although calcification and the absence of lining cells make histopathologic diagnosis impossible, a rather accurate classification of this cyst is possible. Being a large, single, subcapsular cyst, it falls into Fowler's morphologic classification of a hemorrhagic or serous cyst. The history of injury appears to further substantiate a traumatic origin. If so, it may be considered a false cyst, and one may suppose that lining cells were absent prior to calcification.

The question arises whether the time of the injury and onset of the patient's weakness have a cause and effect relationship or are coincidental findings. Fowler⁵ has shown that hemorrhagic cysts can develop in one year or may delay as long as forty years. Since splenectomy resulted in prompt return of normal health and vitality, the patient's weakness was apparently caused by hypersplenism. Dameshek and Welch²⁵ believe that anatomic enlargement of the spleen leads to physiologic hyperfunction, because various splenomegalies are accompanied by neutropenia, anemia, thrombocytopenia, or combinations of these, including panhematopenia. They state, therefore, that cytopenia plus splenomegaly does not point to any diagnosis but to hypersplenism. They have listed the following among causes for hypersplenism: Gaucher's disease, cirrhosis of the liver, Boeck's sarcoid, malaria, Hodgkin's disease, rheumatoid arthritis, and syphilis.

If this concept is accepted, it may be concluded that our patient had hypersplenism as a result of anatomic enlargement of his spleen caused by a large solitary splenic cyst.

SUMMARY

1. A case report is presented of a man with a complaint of weakness for fifteen years who had a solitary cyst of the spleen associated with hypersplenism.
2. Present concepts of splenic physiology are reviewed.
3. The possible relation of the solitary cyst to hypersplenism is discussed.

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IN SOME PATIENTS with polyposis of the colon, total colectomy with preservation of the rectum may be the best operation. However, rectal examination must be performed and recurrent polyps removed endoscopically at regular intervals after operation; if the patient's cooperation in this respect cannot be assured, the rectum must be removed with the colon. Proctoscopic examination of polyps removed is essential to detect malignant change.

Ileoproctostomy is suitable when (1) few or no polyps are observed in the rectum or (2) biopsy reveals that polyps are juvenile, with dilated glands interspersed within a vascular, loose connective-tissue stroma, rather than adenomatous.

The operation consists of removal of the colon together with a section of terminal ileum less than 30 cm. in length; 8 to 25 cm. of the rectum is left in place. Risk of subsequent polyp formation and cancer is less if the rectal segment is short. An end-to-end anastomosis is performed at the level of the peritoneal reflection; end-to-side union is less satisfactory, since a blind pouch, difficult to inspect with the proctoscope, is formed.

Complications include subdiaphragmatic and pelvic abscesses, mechanical obstruction due to adhesions, and abdominal cramps in the early postoperative period.

Bowel function is generally satisfactory after operation, and fecal incontinence and diarrhea are rare. Growth and physical development of children are not retarded by colectomy. With ileoproctostomy, the rectum need not be mobilized, and pelvic sympathetic nerves are not injured. Therefore, the operation does not endanger sexual function in males, as does coloproctectomy.

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Roentgen Diagnosis in the Acute Abdomen

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THE ACUTE ABDOMEN often closely precedes or follows surgery. At such a time, roentgen examination becomes extremely important. Unfortunately, most of these patients are too ill or too uncomfortable to cooperate to the utmost in obtaining the most valuable films, technically speaking.

The single anteroposterior film of the abdomen is most commonly requested. Taking such a film causes the patient the least disturbance, but it frequently creates more questions than answers. Therefore, the radiologist is faced with the problem of additional views, such as laterals or tube-side plate-side, standing, inspiration, expiration, or even barium or Lipiodol studies. The proper combination of positions results in the most accurate diagnosis of the nature and location of the patient's disturbance.

Patients are most frequently referred postoperatively for roentgen examination because of suspected ileus, internal bleeding, leakage at the site of anastomosis, or ureteral compromise. At times, it is surprising how much suction tubes, feeding tubes, and catheters can contribute to malposition and malfunction.

A horizontal beam film, that is, a film of the patient standing or turned on one side is invaluable in detecting free air and fluid levels in abscesses and in an obstructed bowel. The next step in diagnosing ileus is to determine the type of bowel distention. Small bowel distention can result from indirect or paralytic and direct or mechanical causes. The so-called "sentinel" loop sometimes apparent in appendicitis, ureteral colic, and biliary colic is easily overlooked. Paralytic and mechanical obstructions present greater degrees of distention and involve more loops of bowel. The small bowel is most often distinguished by its central location in the abdomen, horizontal or slightly oblique layering of distended loops, and a faint spiral pattern in the distended walls. Malrotations and hernias lead to confusing displacements of distended

loops of the small bowel. In general, the colon is capable of greater distention, the haustral markings become stretched, and a more angular pattern is found. Torsions and volvulus sometimes completely reverse the areas in which we expect to find certain segments of the bowel.

A lateral film in addition to the conventional anteroposterior film is particularly valuable in distinguishing the small bowel from the large bowel, especially in cases of internal hernias. It is also effective in differentiating the anteriorly located biliary tract stones from renal stones, and, in some cases, discloses penetration of sharp foreign bodies through the gut wall.

The timing of the roentgen study in relation to intensity of symptoms is important. Examinations performed when symptoms are absent or lessening are usually not as revealing as those performed when symptoms are intense. Internal hernias often reduce themselves and, therefore, cannot be detected when symptoms are decreasing. When there are no symptoms, we have very rarely found evidences of an adhesive band, anomalous vessel, or diverticulum which could be definitely related to the patient's recurrent attacks of acute abdominal symptoms.

Vascular disease is being encountered more frequently as our population ages. Mesenteric thromboses cause trouble on plain films because of the sharp cutoff between the air-distended bowel in the involved segment and the normal bowel in the continuing uninvolved segment. In these patients, a cautious barium enema demonstrates the normal junction between the undistended and distended portions of bowel. Aneurysms of the abdominal aorta can usually be suspected first by a thin layer of calcium deposit in the wall of the diseased aorta, and, second, by the soft-tissue density mass displacement of the adjacent bowel. These findings are often more prominent in oblique or lateral films than in anteroposterior films.

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Increased fluid or exudate in the peritoneal cavity increases the general density of the abdomen and reduces the sharpness of detail on the film. In ascites, the bowel tends to float on the fluid. In peritonitis, a coating on the outer walls of bowel keeps the contiguous loops constantly separated. The chronic bowel wall thickenings seen in ileitis and ulcerative colitis cause similar separations, but less fixation to adjacent bowel loops.

Intussusception is usually suspected from the history and physical findings and confirmed by barium enema visualization of the coil spring pattern of barium between the mucosal layers of the telescoping bowel. If the lesion is spontaneously reduced by this procedure, the surgeon should not feel thwarted nor should the radiologist be elated. Depending upon duration of the intussusception, the bowel wall may be in imminent danger of necrosis. Whether the original cause of the lesion is a polyp, lymphosarcoma, cancer, or congenital abnormality of the bowel wall or mesentery, intussusception can recur.

Barium enemas are also helpful in differentiating the large bowel from the small bowel, particularly in infants in whom congenital atresias cause tremendous dilatations of the small bowel. Some causes of significant bleeding can also be detected by such an examination. Barium taken orally is not recommended if there is any question of bowel obstruction, but our attitude is changing to favor its use in critical internal bleeding to expose varices or penetrating ulcers. Usually these are chance examinations, since the patients are in such critical condition that one can only passively watch and hope the barium shadow will reveal something helpful.

Diaphragmatic excursion is an indirect but valuable guide to conditions below the diaphragm. Fluoroscopy is most often requested to detect splinting or immobility of the diaphragm on the affected side. Since fluoroscopy yields only the observer's opinion of what he thought he saw, we frequently make film records by the double exposure technic. The first exposure is made at the expiration phase of respiration, and the second exposure at inspiration without mov-

ing the patient or film. About 90 per cent of usual single exposure factors is most appropriate. The resulting single film records diaphragm movement. We have been confused by previous phrenic nerve crush and severe emphysema, but otherwise have found the single film valuable.

Ruptures or tears of the liver usually do not leave time for helpful or specific roentgen studies. Ruptures of the spleen with resulting hemorrhage cause a massive increase in density in the left upper quadrant of the abdomen and displacement of adjacent hollow structures. Kidney trauma is rarely detected on plain films, although severe tears and resulting hemorrhage totally distort the usual renal shadow and adjacent psoas muscle shadow. Intravenous pyelography can be performed rapidly and provides helpful information. In a torn kidney, the dye extravasates through the damaged area and into the perirenal zone. Nonvisualization sometimes occurs on the suspected side because of reflex processes for twenty-four to thirty-six hours after trauma, and a retrograde pyelogram usually shows no gross damage in these cases. The intravenous pyelogram is also of great value in patients in whom the ureter may have been severed or tied off and in patients with a fractured pelvis in whom the likelihood of bladder puncture is great.

Even a most casual survey of the diagnostic problems of the acute abdomen would be inadequate if we did not mention the origins of symptoms from the chest. Coronary occlusion, pneumonia, and spontaneous pneumothorax can all produce dramatic abdominal symptoms. Antibiotics have so drastically reduced the incidence and severity of pneumonia that we tend to forget it. Sometimes a chest film provides a clue to abdominal possibilities when enlarged lymph nodes are visible from infectious mononucleosis or one of the lymphomas is present.

In summary, the roentgen examination of the acute abdomen can offer a great deal of diagnostic information if adequate examination is possible, the right combination of technics is used, and examination is performed in proper relation to exacerbation and free interval of symptoms.



Medical Obstructive Jaundice

Report of a Death Due to Methyltestosterone

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MEDICAL OBSTRUCTIVE JAUNDICE is an intra-hepatic disease with characteristic features of surgical obstructive jaundice. This clinicopathologic entity and diagnostic problem is caused by viral agents and various drugs. Its incidence is reportedly low and no fatalities have been directly attributed to it in the past.

This is a report of an unusual case of medical obstructive jaundice caused by methyltestosterone in a patient, apparently cured of cancer of the large bowel, who failed to recover after withdrawal of the drug and institution of supportive measures including adrenal corticosteroid therapy. Autopsy findings are also included.

CASE REPORT

E. F. P., a 60-year-old white man, was readmitted to the Fargo Veterans Administration Hospital on December 20, 1955, because of a painful draining perineal sinus, the residual of a combined abdominoperineal resection for a carcinoma of the rectosigmoid performed on May 31, 1955. At the time of surgery, the tumor almost completely occluded the lumen of the bowel. It measured 5 cm. in length and 5 cm. in circumference, extended completely through the bowel muscle into the serosal fat, and had metastasized into many of the regional mesenteric lymph nodes. The liver was reported normal on palpation. Microscopic examination revealed a poorly differentiated adenocarcinoma of the rectosigmoid with metastatic tumor in 8 of the 13 lymph nodes. Except for persistent drainage from the perineal region, the patient felt fairly well postoperatively, gained 5 lb., had a fair appetite, and a well-functioning colostomy.

Family history. Father died of cancer of the stomach at the age of 77.

Past history. Jaundice occurred during the patient's early childhood. He was a blacksmith by occupation.

Physical examination. Well-developed and well-nourished 60-year-old white man. Temperature, pulse rate, and blood pressure were normal. A grade II blowing systolic murmur was heard over the precordium. A well-healed paramedian incisional scar and colostomy stoma were noted in the left lower abdominal quadrant. No abdominal masses or organs were palpable. Within the perineal region, he had a draining perineal sinus with foul smelling drainage.

Laboratory studies. On admission, complete blood count was normal. Urinalysis was normal. Serology was negative. Chest roentgenogram was essentially negative.

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X-ray film of the pelvis showed arthritic changes in both hips without evidence of metastatic lesions.

Course in hospital. On January 1, 1956, the ostium of the sinus was enlarged with evacuation of 30 cc. of purulent material. Biopsy from the wall of the cavity showed subacute and chronic inflammation with fibrosis and no evidence of carcinoma. Healing progressed very slowly. To increase the patient's protein anabolism and healing power, on February 14 he was placed on 10 mg. of methyltestosterone (Metandren linguets) three times a day. He began complaining of anorexia and nausea on April 4. Vomiting and jaundice associated with light colored stools and dark urine appeared several days later. Because methyltestosterone was not recognized as a potential hepatotoxic agent, it was not discontinued until the patient was first seen in consultation on April 27. At that time, jaundice was pronounced, the liver was slightly enlarged but not particularly tender, and marked tenderness was present in the right upper abdominal quadrant. Laboratory studies (table 1) indicated an obstructive jaundice. The possibilities of metastatic cancer to the liver, obstruction of the common bile duct by a silent stone or tumor, and a cholangiolitic hepatitis were considered. Because of the abdominal pain and rising leukocyte count, exploratory laparotomy was seriously considered. Eventually, however, the diagnosis of medical obstructive jaundice caused by methyltestosterone prevailed.

The patient tolerated oral gastric tube feedings very poorly. Therefore, he had to be maintained principally by parenteral fluids during the last month of his illness.

Anorexia, nausea, abdominal pain, and some vomiting occurred almost daily. Listlessness, lethargy, and mental confusion were progressively apparent. The hypoprothrombinemia was corrected by use of vitamin K₁ oxide (Mephyton). He exhibited a picture of dehydration and metabolic acidosis (table 2). His urinary output was good, averaging 3,000 cc. daily. He was afebrile throughout his hospital stay. His apathy was pronounced, and he frequently expressed the desire to die. Even with artificial alimentation, measures to combat fluid and electrolyte imbalance, antihistaminic and prophylactic antibiotic therapy, and intravenous injections of Solu-Cortef, he grew progressively worse and died May 29.

Autopsy showed him to be emaciated, dehydrated, and markedly jaundiced with a colostomy opening in the left side of the abdomen and a perineal sinus, measuring 2 cm. by 2.5 cm., lined with raw granulating tissue. The autopsy was limited to an abdominal incision. The heart and lungs were normal on palpation through a diaphragmatic opening. Sections of lungs under the microscope exposed a few patches of old organized

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TABLE 1
LIVER FUNCTION STUDIES

Date	Serum bilirubin		Cephalin-cholesterol flocculation (Hanger)	Thymol turbidity (Maclagen)	Thymol flocculation (Necfe)	Serum phosphatase (K-A)	Serum cholesterol (Bloor)		Urinary Uro-bilinogen (Ehrlich)	Fecal Uro-bilinogen	Prothrombin activity (Mod. Quick)
	Direct	Total					Total	Esters			
4/10	5	10	negative	2.5	negative	8.4			9.6		
4/20	20	61	negative	3	negative	12.6	219	51			92
4/30	46	123							1.3	9	20
5/5			negative	1.1	negative		159	62			9
5/7			negative			20					48
5/11						20					62
5/14			negative	3	negative	16	174	35			
Normal values	0.2 mg. %	1 mg. %	0-1+	0-5U 30 min.	0-24 hr.	0-13 U %	150-225 mg. %	60-80 % of total	2-3 mg. 24 hr.	30-200 mg. %	70-100 % of N

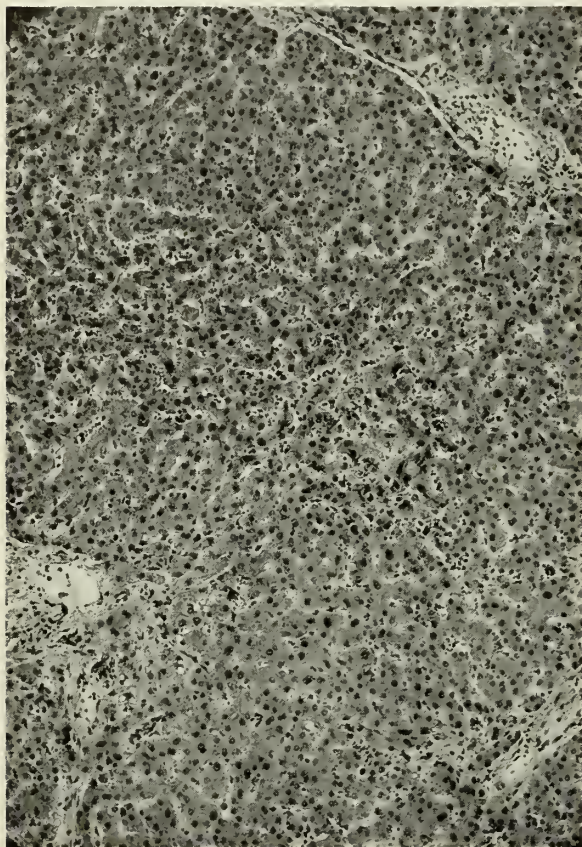


Fig. 1. Microscopic section (x78) of intrahepatic obstructive type of liver damage.

exudate within the alveoli but were otherwise within normal limits. The liver weighed 2,040 gm. and was smooth and dark greenish-brown. The biliary ducts were patent and of normal size. Microscopic examination of liver sections showed degeneration of the liver cells in the central parts of the lobules associated with numerous intracanalicular bile plugs (figure 1). The cells near the periphery of the central degenerated areas disclosed enlargement, and their nuclei were occasionally large and hyperchromatic, indicating toxic and degenerative changes. The liver cells at the periphery of the lobules and periportal areas were within normal limits. The kidneys were both enlarged, weighing 280 gm. each. Microscopically, they were within normal limits, except for the presence of bile-stained protein material in the proximal tubules and inspissated bile stained protein casts in the distal and collecting tubules (figure 2). A few small areas of old walled-off fat necrosis were noted within an otherwise normal appearing pancreas. A section of the sinus tract revealed a dense scar and chronic inflammation. No evidence of carcinoma could be found. Dr. Donald F. Gleason, the consulting pathologist, agreed with our conclusion that the obstructive type of liver damage and the bile nephrosis was consistent with a toxic reaction to some drugs. In this case, methyltestosterone was at fault without doubt.

DISCUSSION

Medical obstructive jaundice has been termed cholangiolitic hepatitis, primary or intrahepatic cholestasis, intrahepatic obstructive jaundice, regurgitative jaundice, hepatocanalicular jaundice, thrombosing cholangiolosis, intrahepatic obstructive cholangitis, and toxic hepatosis.¹⁻²³ It apparently is caused by viral infections and drug

TABLE 2
SUMMARY OF LABORATORY STUDIES

Date	Hemoglobin	White blood count	Sedimentation rate	Urine	Serum Sodium	Serum Potassium	Serum Chloride	Carbon dioxide	Blood urea nitrogen
12/20	95	8,500	18	negative					
4/20	106	7,900	26	+ bile					
4/30	97	14,000	20	tr. alb.	132	6.1	118	7	59
5/3	94	12,250	33	tr. alb.	141	5	108	13	74
5/7	97	15,200	34		143	3.5	86	14	71
5/17	81	13,000	18	+ alb.	158	3.7	108	18.4	101
5/22	85	19,000	30		148	3.7	80	19.2	47
5/28								7.2	
Normal values	14.5 gm. = 100%		0-10 mm. in 1 hr.		138-150 mEq./L.	4-5 mEq./L.	97-106 mEq./L.	22-34 mEq./L.	10-15 mg. %

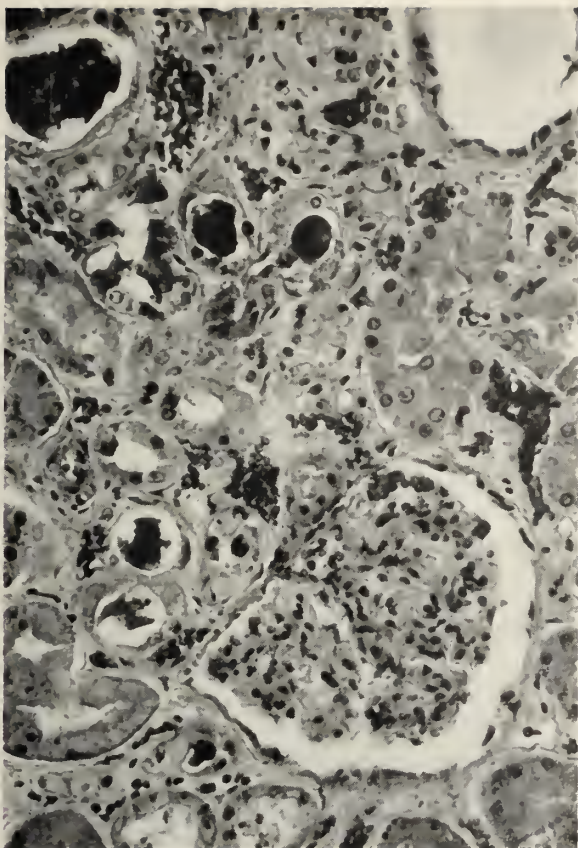


Fig. 2. Microscopic section (x175) of bile nephrosis.

reactions. In 1937, Eppinger¹ was one of the first to describe the pathologic findings of this entity in some of his cases of "catarrhal" jaundice of viral etiology. In 1946, Watson and Hoffbauer² reported an occasional case of viral hepatitis with predominantly cholestatic features and little or no disturbance of liver cell function, which they called cholangiolitic hepatitis. In 1947, Werner³ was the first to suspect that methyltestosterone could be a cause of medical obstructive jaundice. He mentioned 3 of his own cases and 6 cited to him by other physicians. In only 1 of these cases was the drug given a second time, resulting in a recurrence of "jaundice." A full report on 7 cases directly implicating methyltestosterone was made by Werner and associates⁴ in 1950. They stated that repeat courses with methyltestosterone in 2 of these patients failed to reproduce jaundice. Up to the present time, there have been 19 documented cases of methyltestosterone jaundice³⁻⁹ with many more merely mentioned in the literature. Within the past decade or two, drugs such as arsphenamine,¹⁰ dinitrophenol,¹⁰ thiouracil,¹¹⁻¹³ chlorpromazine,¹⁴⁻¹⁹ and Atophan¹⁷ have been suggested as causes of medical obstructive jaundice.

Although the incidence is said to be low, this complication of drug therapy seems more frequent than the published reports indicate. This is the first known fatality directly attributed to medical obstructive jaundice in spite of withdrawal of the offending agent. It is not within the scope or purpose of this paper to review the literature or to discuss the intricate and obscure problem of pathogenesis. Briefly, it has been hypothesized that jaundice is due to injury or dysfunction of the bile canalicular lining, the cholangioles, central liver cells, or an essential hepatic metabolite because of a patient's allergy, susceptibility, idiosyncrasy, or hypersensitivity to some viral or therapeutic agents which result in bile stasis or plugging of the canaliculi.¹⁻²³

The methyltestosterone pathologic reaction presents a distinctive picture of bile stasis within the canaliculi of the central zones of the liver lobules with little or no liver cell damage, no periportal cell infiltration, and no obstruction of the larger bile ducts. The normal architectural liver pattern is retained. It differs from the obstructive jaundice in cholangiolitic hepatitis and from that due to other hepatotoxic drugs by the absence of lesions in the portal triad or swelling of bile ducts. The unusual degree of central hepatocellular degeneration and atrophy in this case can undoubtedly be attributed to the final stage of severe toxicity and bile stasis or agonal changes — a condition not previously reported.

A careful history and examination supplemented by proper utilization and interpretation of modern biochemical tests to determine hepatic function, with a needle liver biopsy if needed, have increased our ability to correctly diagnose liver disease or jaundice. Thus, obstructive jaundice as a rule is readily differentiated from hepatocellular or hemolytic jaundice. This is important, since patients with acute viral hepatitis or cirrhosis are adversely affected by an operation. However, medical obstructive jaundice cannot usually be distinguished by laboratory tests from extra hepatic obstructive jaundice that requires surgery. Since these cases tolerate surgical exploration well,²⁰⁻²³ the main objection to surgery is its needlessness.

Medical obstructive jaundice presents a major diagnostic and therapeutic problem. Liver biopsy may be the only way to differentiate intra-hepatic cholestasis without hepatocellular degeneration from jaundice requiring surgery, but such is the case only after the disease has been prolonged. Yet, a careful history and examination often reveal the prodromal symptoms and signs of viral infection with atypical lymphocytes in the peripheral blood smear, or admin-

istration of a hepatotoxic agent may provide a clue. A transient eosinophilia, urticaria, or asthma may occur at the onset of illness because of medical obstructive jaundice. Although no laboratory tests can be substituted for careful, continued clinical observation of a patient with jaundice, a relatively mild to moderate increase in alkaline phosphatase and a normal to slight increase in total cholesterol with an abnormally reduced cholesterol ester ratio of the serum apparently favor intrahepatic over extrahepatic obstructive jaundice. After exhaustive study and observation, these cases may often be identified only after a negative surgical exploration of the extrahepatic biliary system. In an effort to find a differential therapeutic and diagnostic test, Johnson and Doenges¹⁸ recently tested the value of intravenous corticotropin therapy in 2 cases of viral cholestasis. The resultant release of intrahepatic obstruction, manifested by a prompt and pronounced drop in serum bilirubin, was considered valuable in differentiating viral cholestasis from extrahepatic obstructive jaundice. Conflicting reports on the therapeutic value of corticotropin and adrenal steroids in the treatment of medical obstructive jaundice have appeared in the literature.^{6,18,19} In a few cases of methyltestosterone liver injury, including this one, no beneficial response was observed when hormonal therapy was administered. Another hydrocholeretic agent was contemplated but withheld because of the lack of experience with sodium dehydrocholate in such instances. It has recently been shown that it is contraindicated in intrahepatic obstructive jaundice,¹⁹ although bile salt therapy also has its advocates.²²

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SUMMARY

A fatal case of medical obstructive jaundice implicating methyltestosterone as the causative agent is reported. Autopsy findings are included.

Viral and therapeutic agents may cause a medical or nonsurgical type of obstructive jaundice.

The difficulty in differentiating cases of medical and surgical obstructive jaundice with several possible diagnostic aids is discussed.

Discriminatory selection of drugs, awareness of the possibility of a hepatotoxic drug reaction as a cause of jaundice, and immediate withdrawal of the suspected drug is obligatory.

Biliary stasis as an untoward reaction to a drug should not be considered harmless.

Acknowledgment is made to Dr. Donald F. Gleason for preparation and interpretation of microscopic slides and microphotographs.

Postoperative Psychoses

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OUR INTEREST in this subject stems from the praiseworthy trend in recent years to incorporate psychiatric units as integral parts of general hospitals. As a result, the practicing psychiatrist now has more opportunity to study and treat the acute psychotic reactions which develop during the postoperative period.

The term "postoperative psychosis" is a misnomer if it is construed to imply a specific type of mental illness comparable to the involutional or puerperal psychoses. Each of these has individual characteristics sufficiently typical to justify their separate classification. Yet, there is no doubt that mental illness often develops immediately after surgery. It is essential to recognize that psychoses occurring in the postoperative period represent not a specific diagnostic entity, but a conglomeration of at least 4 types of psychoses of varying etiology. The proper treatment demands an appreciation of the different causes. These include: (1) withdrawal psychoses in patients previously dependent on alcohol or barbiturates, or addicted to narcotics; (2) toxic psychoses due to medication given before and after surgery; (3) psychoses of circulatory and respiratory origin caused by cerebral hypoxia; and (4) activation of one of the functional psychoses precipitated by the physiologic stress of surgery in a predisposed patient. The functional psychoses activated by the stress of surgery usually run a prolonged course and require specialized psychiatric care, often including shock therapy. Postoperative psychoses of the other 3 types tend to be acute, of short duration, and will usually be treated in the general hospital by the surgeon as a complication of the operation.

The incidence of postoperative psychoses varies greatly. The surgeon who is unaware of the mechanisms involved in these conditions meets such psychoses far more often than the surgeon who takes preventive measures and is alert for the early signs of such an impending reaction. Fishberg¹ found the frequency of postoperative psychoses to be 1 in 400 operations. Both he and Abeles² describe a somewhat higher inci-

dence in women. Generally, psychoses are most apt to occur following surgery in the aged, the alcoholic, drug addict, the emotionally unstable patient, and after surgery on the genital organs or for cataract.

PSYCHOSES DUE TO DRUG WITHDRAWAL

In individuals who have been taking drugs or alcohol in large quantities over a prolonged period, it is characteristic that abrupt withdrawal of the drug will be followed after several days by the development of an acute toxic psychosis. Delirium tremens which appears some days after the sudden cessation of drinking is a classic example. An identical syndrome of delirium tremens can occur after a similar latent period following withdrawal of barbiturates or narcotics in habitual users. Sudden emergency hospitalization and surgery obviously furnish ideal circumstances for the precipitation of such a withdrawal psychosis.

This problem is academic to the family doctor who is well acquainted with his patients and their habits and who has provided them with regular medical care over a period of years. However, in the larger cities, a surgeon often operates upon a patient whom he has first seen only an hour or two previously. And even in smaller communities, highway accidents, visitors, and other transients occasionally force the general practitioner to operate upon a stranger whose background and habits are unknown to him.

This type of psychosis is, perhaps, encountered the least often of the postoperative mental reactions, but is the one in which the greatest errors in diagnosis occur. Such errors lead to mismanagement and consequent prolongation of disability or, occasionally, to a fatal outcome. Typically, the patient does very well for forty-eight to seventy-two hours after surgery, and then begins to act confused. He makes irrational remarks and moderate tremor may develop. He is usually worse at night. This stage of incipient psychosis is characterized by intermittency, periods of clarity alternating with periods of con-

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fusion. An unexplained grand mal convulsion during this period may afford an important clue to the fact that psychotic symptoms of withdrawal from alcohol or barbiturates are developing. The full-blown psychosis appears very rapidly four to seven days after surgery with delirium, clouding of consciousness, restlessness, vivid hallucinations of any of the senses, and paranoid delusions as the outstanding symptoms. Mortality in such cases is about 10 to 15 per cent and probably higher in patients who have just undergone major surgery. The course is acute and results in death or recovery in two to ten days. Rarely, instead of an acute termination, the picture of a Korsakoff's psychosis may develop and run a prolonged course of many weeks or months.

The most effective treatment of such psychoses is their prevention. When the patient's past history indicates continuous dependency on barbiturates or alcohol up to the time of admission, one of two courses may be followed. If the contemplated operation is elective, the patient should be in the hospital under strict supervision for at least one week preoperatively. More often, however, surgery in such patients is of an emergency type. In this event, vigorous treatment with adequate fluids, large amounts of oral or parenteral protein and glucose and intravenous or intramuscular vitamin B complex should be instituted in the immediate postoperative period and continued for several days until the danger is passed.

Sedation with narcotics or barbiturates should be minimal. A tranquilizing agent, such as chlorpromazine administered in adequate doses of several hundred milligrams a day is very helpful. If the withdrawal is from a narcotic, immediate replacement therapy with the offending drug should be started, usually in one-half the dose taken preoperatively, and continued through the postoperative period. Later, gradual withdrawal may be carried out, coupled with psychiatric treatment. Obviously, when emergency surgery is necessary in a known narcotic addict, the drug should be continued through the postoperative period. Withdrawal of the drug and treatment of the addiction can be handled at a later date. In contrast to narcotic addiction, it is highly debatable whether replacement therapy with small doses of barbiturates or alcohol benefits the patient in whom a psychosis is developing because of their withdrawal. In our experience, we have found that nothing is gained by giving such patients barbiturates or alcohol when psychotic symptoms are developing. In addition to these therapeutic measures, the use of adrenal

cortical extract is invaluable and occasionally lifesaving. We do not use this agent routinely but reserve it for the patient who is doing badly or whose general physical condition is very poor.

TOXIC PSYCHOSES DUE TO DRUGS

Narcotic analgesics and barbiturates for sedation can precipitate a toxic psychosis in the patient who does not use such drugs often as easily as can their withdrawal in the habitual user. Good surgical judgment often demands fairly complete relaxation during the postoperative period. However, there are undoubtedly occasions in which a slight degree of pain or restlessness is preferable by far to the alternative of a disturbed patient, delirious from too much medication. The need of prompt and accurate diagnosis of the mechanism of this type of reaction is obvious to prevent aggravating the condition through improper treatment. A vicious circle can be easily established. The patient displays early symptoms of a toxic psychosis resulting from overdosage of narcotics or barbiturates. Unaware of the cause of the patient's disturbed behavior, the physician adds fuel to the fire by attempting to quiet his patient with still further doses of drugs. Under some conditions, even moderate amounts of medication can accumulate very rapidly. This may occur in the markedly dehydrated or alcoholically intoxicated patient who requires an emergency operation. It is also seen in the patient whose ability to detoxify or to excrete drugs is impaired because of disease or injury of the liver, kidneys, or lungs. Finally, the postthyroidectomy patient in whom a relative myxedema occurs may show sensitivity to drugs.

The clue to proper diagnosis in this group of patients lies in the clinical signs of acute intoxication caused by a cerebral depressant. The patient is drowsy, his speech is slurred, and nystagmus and ataxia develop. His psychotic syndrome is variable but is usually a state of confused restlessness with disorientation and dull intellectual functions. Although the classical picture of a toxic psychosis is most common in this type of postoperative reaction, there are variations which may trap the unwary. The psychosis seen with cortisone intoxication is usually manic in type. Bromidism can produce a psychosis clinically indistinguishable from a depression or schizophrenia. In these cases, errors in diagnosis will be followed by errors in treatment and prognosis.

The problem of preventing postoperative psychoses due to drug intoxication must include the preanesthetic medication and anesthesia as well as postoperative analgesics. Attempts to relieve all pain and restlessness after surgery sometimes

lead to excessive use of narcotics and sedatives. A mild degree of restlessness not only indicates a subtoxic level of narcotics but also aids the patient by preventing relaxation so complete that cerebral anoxia results. Another reason for the excessive use of cerebral depressant drugs after surgery stems from the surgeon's fear that a restless patient may damage his incision or otherwise destroy the surgical result. It is perhaps presumptuous of a medical neurologist to express the opinion that surgeons tend to underestimate the strength of a surgical suture. And yet, several times we have seen patients with psychoses after cataract surgery so disturbed and hyperactive that forcible restraint was required, which did not result in any harmful effect on the operated eye. I have yet to see a surgical incision break down because of a postoperative psychosis.

In spite of the utmost caution in the use of narcotics and sedatives after surgery, a toxic psychosis develops in some patients. Obviously, treatment consists of immediate discontinuance of all cerebral depressants. Usually, the patient's condition demands some form of relief from pain and restlessness. When narcotics and barbiturates are contraindicated, a tranquilizing drug or physical sedation with wet body packs may be helpful. Chlorpromazine, through its synergistic effect on opiates and barbiturates, is also useful in permitting smaller doses of these drugs than would otherwise be possible in the early postoperative period.

PSYCHOSES DUE TO CEREBRAL VASCULAR INSUFFICIENCY

The third major cause of postoperative psychotic reactions is vascular in nature. The brain is unable to function anaerobically even for very short periods. Adequate amounts of oxygen are essential at all times. This, in turn, requires good pulmonary ventilation, a sufficient hemoglobin concentration to transport oxygen, enough hydration to prevent circulatory stasis from hemoconcentration, an adequate arterial pressure, and a sufficient caliber and elasticity of the cerebral arteries and arterioles. A breakdown of any one of these elements can result in the condition referred to by Corday³ as acute cerebral vascular insufficiency. Several factors, each too minor to produce cerebral anoxia alone, may combine and lead to psychosis on this basis. Cerebral thrombosis and embolism are well-known complications of surgery. Less widely recognized, but probably a more common source of trouble, is a relative lack of oxygen in the brain due, not to arterial occlusion, but instead to a combination

of the factors mentioned previously. Postoperative psychoses of this type are most prevalent in the elderly patient with some arteriosclerosis. The relative frequency of acute mental reactions after cataract operations can be explained by the fact that cataract patients, on the average, are older than any other surgical group. The general practice of early ambulation after surgery has decreased the incidence of anoxic psychoses by minimizing circulatory stasis. Other factors contributing to cerebral anoxia include decreased respiratory exchange due to immobilization in bed, pneumonia or pulmonary edema, splinting of the chest wall as a result of pain that follows surgery in the upper trunk, and the use of such respiratory depressants as morphine. Uncorrected blood loss is still another source of cerebral anoxia, at first by the development of shock with associated arterial hypotension and later as a result of anemia.

The clinical picture in postoperative psychoses resulting from cerebral anoxia is easily recognized. The patient usually does well for twenty-four to forty-eight hours after surgery. The first symptoms almost always appear at night with transient confusion, possibly with delusions or hallucinations. This disturbed nocturnal behavior is typically followed by a day of mental clarity, often with insight into the previous night's symptoms. The clear day is followed by an even worse night. This alternating pattern may continue for two or three days before the patient enters a continuous psychotic state.

The prevention and treatment of this type of psychosis may be complex and demands a thorough knowledge of the physiologic problems involved. In elderly patients requiring surgery, it is imperative to use the least amount of general anesthesia and postoperative narcotics consistent with good care. Meticulous replacement of blood loss and maintenance of fluid balance are essential. Early ambulation, even frequent turning in bed, minimizes circulatory stasis. The intermittent use of 5 per cent carbon dioxide in oxygen is important. Parenthetically, it should also be emphasized that postoperative nocturnal restlessness in the elderly patient is often best relieved by oxygen and that this group of patients may react to barbiturates in a paradoxical manner with increased restlessness. The problem of cerebral vascular insufficiency in the elderly patient has been discussed elsewhere.⁴

Perhaps the commonest type of psychosis in the postoperative period results from a combination of cerebral vascular insufficiency and a toxic reaction to opiates and hypnotics.

In this group, a latent schizophrenia or affective (manic or depressive) psychosis develops during the postoperative period. Surgery acts solely as a stress factor precipitating the mental illness in a predisposed individual. These patients follow the same clinical course and receive the same treatment as those in whom similar psychoses develop unrelated to surgery. Usually, specialized psychiatric hospital care and often some form of shock therapy are required.

We feel that routine methods of shock treatment can be started without increased risk one month after surgery which involves opening the thoracic or abdominal cavities. If the patient's mental condition demands shock treatment earlier, it can usually be given safely at any time postoperatively if modified by curare, succinylcholine, or a similar muscle-paralyzing drug. Convulsive therapy for patients after herniorrhaphy or after orthopedic procedures on the skeleton should always be modified with curare or succinylcholine because of the danger of damaging the operative result.

If the treatment of this type of psychosis after surgery is the province of the neuropsychiatrist, the prevention of these psychoses is the proper function of the general practitioner, surgeon, or internist, who sees the patient preoperatively. Several factors must be considered in evaluating the risk of such a surgical complication. Foremost is the patient's personality. A past history of a psychosis should warn the surgeon to be prepared for a recurrence postoperatively. The shorter the time since recovery from a mental illness and the less complete the recovery, the more likely a postoperative psychosis is to develop. As a rule, a full year should elapse between treatment for mental illness and elective surgery. A brief psychiatric history is invaluable in determining the extent of the patient's recovery from a previous psychosis. It is important to know the patient's attitude toward his former illness, the existence of continuing "nervousness," insomnia, anorexia, and weight loss, or delusional ideas. Relatives can provide useful information about the patient's adjustment in his family, to his work, resumption of interest in his former hobbies, and similar evidence of a restoration to healthy mental attitudes. If such a history indicates a reasonably complete recovery maintained over a period of at least a year, there should be little increased risk of a recurrence after surgery.

The patient who never had a previous psychosis but whose personality is unstable presents a somewhat more subtle threat of mental break-

down after surgery. Depressive reactions characteristically occur in the "chronic worrier," the excessively neat and meticulous perfectionist who is usually plagued by an overdeveloped conscience. The potential schizophrenic patient displays the personality pattern of a shy introvert, emotionally cold and undemonstrative, often of better than average intelligence, and more concerned with solitary than gregarious interests. In both personality patterns, the potentiality of a psychosis is present and surgery may set it off.

The nature of the operative procedure and the organs involved play some role in the incidence of subsequent mental illness. In more than one-third of Abeles' female patients, postoperative psychoses occurred after procedures involving the uterus or ovaries. Involutional psychoses seem to develop more frequently after removal of both ovaries than in the course of a normal spontaneous menopause. Also, surgery on any reproductive organ is more apt to precipitate a functional psychosis than on other parts of the body. This includes procedures involving the penis, prostate, testicles, uterus, and ovaries, as well as sterilization in either sex and breast in the female. There is also a relatively high risk of postoperative psychoses in thyroid and cataract operations, but for different reasons, as mentioned before. The explanation for the frequency of psychotic reactions after surgery on organs associated with reproduction is not clear. Theories vary from the purely organic extreme of disturbed endocrine function to the psychoanalytic concept of castration fears. The more mutilating procedures, such as amputation or permanent colostomy, seem no more hazardous in this respect than any major surgical procedure.

COMMENT

Whatever the underlying mechanism of the postoperative psychosis, early treatment is of utmost importance and requires early diagnosis. To this end it is essential to train nurses who are in charge of surgical patients to be always alert for signs of a *developing* psychosis rather than to wait until the full-blown mental illness appears. This phase of nursing care has often been neglected, and the responsibility for this lies with us as physicians. These early signs are often transient and may be ignored or their significance misinterpreted. One should emphasize to the nurse the need of watching for and reporting promptly any episode of confusion (especially at night), tremulousness, slurred speech, disorientation, or dulling of the intellectual functions. Once the surgeon is aware of signs of impending psychosis, he can make a rapid survey of the sit-

uation which almost always reveals which type of psychosis is threatening. Proper therapy may then be started promptly.

The problem of elective surgery in the patient with a functional psychosis deserves a few comments. Emergency surgery in the psychotic is no problem; it must be performed as a lifesaving measure. The immediate effects on the psychosis must be disregarded temporarily and treated after the surgical emergency has passed. We have previously mentioned our reluctance to advise elective operative procedures in a patient during the first year after treatment of a major psychosis. Paradoxically, we do not hesitate to recommend such surgery, if indicated, in the patient who is undergoing active treatment for a functional mental illness. The reasons are fairly obvious. The patient is already psychotic and under treatment; his mental reaction to surgery may be a temporary aggravation of his existing psychosis, which is a less devastating experience than is the transition from a relatively normal mental state to a full-blown psychosis. Furthermore, since the patient is under psychiatric treatment before, during, and after surgery, the intensity of his psychotic reaction can often be modified. We feel that in patients with psychoses in whom shock therapy is indicated, the ideal time for elective surgery is immediately after a short course of shock with the understanding that further shock therapy may be indicated postoperatively as soon as feasible. Care must be taken to be prepared for possible active suicidal tendencies that may appear in depressive patients after surgery even though they had not been apparent preoperatively.

During the course of a psychosis, surgery may occasionally even have a beneficial effect on the mental illness. We have recently had under our care a young schizophrenic woman with the delusion that she had cancer in her abdomen. Convinced that she was soon to die painfully, she was actively suicidal and had to be restrained for her own protection. Physical examination of the abdomen and pelvis was entirely negative, but a routine roentgenogram of the chest disclosed a large mediastinal mass. It was entirely asymptomatic and thought to be a lymphoma by the radiologist. A large benign bronchial cyst was found at surgery and totally removed. After the operation, the patient's delusions rapidly subsided, she developed good insight, her suicidal tendencies disappeared, and she was discharged from the hospital several weeks later fully recovered both mentally and physically. In such cases, surgery may act as a form of shock therapy. In this case, probably the reinforcement of her de-

lusion by the appearance of a real neoplasm and its subsequent removal hastened the resolution of the previous psychotic pattern of thought.

Another case illustrates the advantage of performing elective surgery during the treatment of the psychosis. A 65-year-old man had been in a state of psychotic depression for two months. He had been advised four months previously that his mild urinary symptoms were caused by a benign prostatic hypertrophy and that he would ultimately need a transurethral resection. After consultation with the urologist, he was given 6 electroshock treatments, which resulted in pronounced relief of the depression. Two days after the last shock treatment, he underwent prostatic resection. His postoperative course was uneventful. He continued to improve mentally and was discharged from the hospital in essentially the same period of time as he would have been if he had not had the operation.

The importance to the surgeon or general practitioner of this matter is the recognition that the best time for elective surgery in the patient with an impending or frank functional psychosis is during active psychiatric treatment rather than before such treatment and certainly never to postpone surgery until after treatment of the psychosis has been completed.

The indications not only for surgery but for the choice of operation may be altered by the fact that the patient is psychotic. In 1948, we had under our care a woman of 62 with a psychotic depression. Her history revealed 7 previous episodes of depression requiring hospital treatment over the preceding forty-five years. After 7 electroshock treatments, she showed pronounced improvement. Proctoscopic examination, made because of rectal bleeding, revealed a sessile polyp of the posterior rectal wall. Biopsy showed that it was an adenocarcinoma. The surgeon believed an abdominoperineal resection would be the procedure of choice if the case were not complicated by the psychiatric problem. Because of her history, we felt that she would react very poorly to a permanent colostomy and that this continuing stress might cause her to become a chronically institutionalized psychotic. After much deliberation between the surgeon and ourselves, he elected to do only an extensive local fulguration of the polyp. When last seen in 1955, she had no evidence of her previous carcinoma and had done at least as well mentally as she had before surgery.

SUMMARY

Psychoses developing during the postoperative period do not represent a specific disease entity

but result from at least 4 types of causes: (1) withdrawal psychoses of the delirium tremens type in patients who have been using large amounts of alcohol, barbiturates, or narcotics; (2) toxic psychoses resulting from idiosyncrasy to or overdose of drugs used in the postoperative treatment; (3) psychoses caused by relative cerebral hypoxia as a result of acute cerebral vascular insufficiency developing in the postoperative period; and (4) functional psychoses precipitated by the physical and psychic stress of surgery, particularly on the genital organs. With the exception of the last group, the vast majority of these reactions will be treated in general hospitals by the attending surgeon rather than under specialized psychiatric care. Again, except for

those with functional psychoses, the overwhelming majority of postoperative mental illnesses run a short, though often stormy course, and prognosis for complete recovery is excellent. Treatment is usually simple and based on an appreciation of the underlying disturbance of cerebral physiology. Verly early diagnosis is essential. For this reason, continuing education of surgical nurses is needed regarding the existence, frequency, and early signs of postoperative psychoses. In those with a developing or frank functional psychosis, any necessary elective surgery should be performed during active psychiatric treatment. The usual surgical indications in the patient with a psychosis may differ from those in the uncomplicated surgical case.

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EMOTIONS that occur as parts of an epileptic seizure and not as reactions to the other events of the attack are most common with cerebral lesions below and adjacent to the fissure of Sylvius.

Ictal emotions are limited to fear, depression, pleasure, displeasure, and, possibly, anger. Fear, the most common of these states, occurs with epileptic discharges involving the anterior half of either temporal lobe. Depression is associated with lesions diffusely distributed in the temporal lobes, while pleasure and displeasure are principally associated with posterior temporal lesions. Depression persists for an hour to three days, longer than most epileptic phenomena.

Ictal emotions are without basis in perception and must be considered as organic hallucinations. Visceromotor activity, such as pounding of the heart, tachycardia, hyperpnea, sweating, or borborygmi often accompanies emotion, as do visceral sensations, such as palpitation, sinking feelings, hollowness, colic, or the desire to micturate or defecate. Seemingly purposive activity, such as running for comfort or calling out may occur during the attack.

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Observations on Hydergine

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HYDERGINE is a sublingual tablet with a faintly sweet taste and is an equiproportional mixture of dihydroergocornine, dihydroergokryptine, and dihydroergocristine as methanesulfonates. Original investigation of these 3 agents, their isolation, chemical definition, and pharmacologic action was carried out by Stoll and Hofmann,¹ Rothlin,² Orth,³ and Bircher and Cerletti.⁴ Each Hydergine tablet contains 0.5 mg. of this mixture. We have noticed no side effects in doses up to 4 tablets daily. The drug appears quite nontoxic. Age, over 60, seems to be no limiting factor; in fact, the older the patient, the better the results.

PURPOSE

Over the past two years we have had occasion to use Hydergine in treating a number of patients. Thus, we have drawn some conclusions which are purely clinical and which have been entirely derived from observing these patients. Generally speaking, we found Hydergine to be of great value to people over the age of 60 or 65. These people were seen in this office for various ophthalmologic disorders. Almost all of them were badly frightened, anxious, and tense no matter what the nature of their pathologic findings revealed. When placed on Hydergine, they improved considerably. The degenerative change or the pathologic entity often remains static or even becomes a little worse; sometimes it improves. The important point is that the patient's attitude toward his problem alters to such an extent that he becomes quite comfortable and is either entirely oblivious of the disturbance or else believes that he is improving. We believe these people do improve in some cases, such as diabetes mellitus. This will be discussed more extensively later in this report. We have observed 32 patients who have been taking Hydergine. Of these, 7 were diabetic and were selected because their records were sufficiently complete to arrive at some conclusion.

According to Selye,⁵ the body is in a continual

state of change, depending entirely upon what stressor agents are impinging upon it. As the individual ages, he becomes progressively less able to withstand such stress. Ever present problems—social, economic, physiologic, pathologic, and changes which occur with infectious diseases and with exposure to heat, cold, or trauma—affect people more severely when they are older. Selye⁶ states that many of these stressor agents have a summative effect when applied simultaneously. That is, if anoxia and fasting are combined, half as much of each is needed to produce an alarm reaction as is required with either alone. Therefore, as individuals grow older, a less distressing situation causes tissue changes than would have been the case when they were younger. The same is true of emotional problems. Many older people are faced with greater emotional problems than they were previously in that their earning capacity, social contacts, cerebration, emotional control, and so forth, are disappearing. Therefore, it is reasonable to believe, and Selye⁷ confirms this, that the emotional aspect of stress is very strong. Situations involving the nervous system are among the strongest stressor agents. When applied to an aging body, they wield even greater influence. In elderly people, less emotional stress will create physiologic changes which are first reversible and later irreversible.

We believe that Hydergine in some way alters a person's susceptibility to emotional states. We have no idea how, but we feel that many people under the influence of Hydergine become a great deal more comfortable. We also feel that in many illnesses, principally the so-called diseases of senility associated with the eyes, a causative factor is stress which may be of an emotional origin. We believe that Hydergine acts as an insulator in such cases by preventing intense reactions to distressing emotional situations. Thus relieved of anxiety, these elderly patients are better able to cope with their problems. This is more particularly true of those with diabetes. Flanders Dunbar⁸ has suggested that there is a strong emotional component in diabetes, which she first mentioned as observed by Menninger⁹ in 1935. Selye¹⁰ also mentioned this possibility.

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We believe that the retinal changes which occur in elderly diabetic patients are commonly influenced by emotional strain. If these people are placed on Hydergine and kept on maintenance doses, fewer retinal hemorrhages will occur because they are apparently less responsive to emotional stress. The cerebral action of this drug is probably responsible for a feeling of well-being which disappears when the drug is discontinued.

Macular degenerative changes also occur in old age, such as blindness. The changes in the retina are easily detected and are usually irreversible. In such cases, patients do not improve with Hydergine, but they are much more comfortable because their inability to read does not seem to distress them.

The following case histories illustrate the foregoing observations. We realize these are purely clinical observations and that anyone can say, "yes, but the patient might have improved anyway." We are aware of this fact. In our honest clinical experience, we believe these patients have improved. We might further add that no patient was given samples of Hydergine. We felt that the use of samples would influence either our ideas or the ideas of the patient. We let them believe that we had used the drug for a long time and simply said it would make them feel more comfortable or better. Patients accepted the drug well. We found that 1 tablet taken under the tongue at bedtime and sometimes on arising was satisfactory. A larger dosage seemed to make very little difference.

The question arises of how can we be sure that improvement was not the result of suggestions. The answer is because when the drug was discontinued, patients began again to feel a little anxious, a bit pressed, and became concerned about their symptoms. Even so, suggestion could be said to be a factor in the relief of symptoms. However, if using this drug is sufficiently suggestive to obtain the results we feel we are acquiring, we are perfectly satisfied.

CASE REPORTS

Case 1. Mrs. V.E., a 67-year-old white woman, was first seen on May 9, 1955. At this time, she complained of high blood pressure and stated that cloudy vision in her right eye and some in the left had bothered her for two or three weeks. Examination revealed that vision in her right eye could be corrected to 20/50 and 20/25 in her left eye. There were some early macular changes in both eyes. When she was seen on May 15, she was unhappy because she stated she was unable to see any better. She had been receiving vitamin B₁₂ shots, which we recommended she continue. She was sent to her general physician for treatment of her hypertension and did not appear in our office again until November 18. At this time she felt her vision was worse and seemed quite apprehensive. Her general physician had stopped all

medication. We put her on 1 Hydergine tablet at bedtime and advised her to return in two weeks. On December 2, 1955, she volunteered no symptoms, looked brighter, and said that she felt much better. She was seen again February 3, 1956, and told us she was going to California. She was quite comfortable and was taking 1 tablet at bedtime only. She did not refer to her eyes, although her vision had not improved.

Case 2. Miss E.D., a 66-year-old white woman, first came to our office on January 29, 1954. She had many symptoms associated with her eyes which were rather vague and way out of proportion to any pathology. Sometime in the past, she had sustained some macular hemorrhages in her right eye which had left her vision reduced to about 20/30. Of course, she was deeply concerned about this. She was given 1 Hydergine tablet to take each night at bedtime. She got along quite well on this dosage until September 3, when she returned to our office. She was frankly psychotic and had all sorts of paranoid delusions. She was sent to a psychiatrist and remained under his care until February 8, 1955, when she again came to our office. She seemed fairly well adjusted; however, she was not allowed to discuss her symptoms at length. She was presbyopic. She got along well until June 2, at which time she again felt she was having trouble with her eyes. She was sent to a psychiatrist who placed her on heavy tranquilizing medication, and she has not returned to our office since. We feel that Hydergine failed to help this woman.

Case 3. On February 16, 1955, Mr. R.F.D., a 67-year-old white man, complained of a sudden loss of vision in his left eye. He had had diabetes for twenty years. Examination of his dilated pupils revealed multiple microaneurysms in each eye, some hemorrhage in the macular area of the left eye. Briefly, both eyes presented the typical retinal macular diabetic change. On March 21, he was placed on Quertine with ascorbic acid. This is hydrolyzed rutin and has been given to many of our diabetic patients on the chance that it may help them. The tablets are composed of 10 mg. Quertine and 40 mg. ascorbic acid. This patient was told to take 1 Quertine tablet three times per day and 1 Hydergine tablet at bedtime. He was seen again on May 25, 1955. At this time, the vision which had been 20/30 in the right eye remained unchanged, and the left eye, which had only been capable of light perception had improved to 20/400. The patient said he could see much better. One month later, he told us he could see quite well. His vision was right eye 20/25 and left eye 20/400. The man was convinced that his vision was greatly improved.

Case 4. Mr. R.H., a 32-year-old white man, was seen first on March 22, 1955. He had had diabetes for nineteen years. He was on 30 units of NPH insulin daily. The left eye had become blurred four weeks previously. He had been blind in the right eye for many years, probably because of diabetes. Retinoscopic examination revealed an old traumatic-like cataract in the right eye, and he could only see a questionable light perception. The left eye, however, had a vision of 20/50. Retinoscopic examination disclosed vitreous hemorrhage, which was fairly dense in some places and smoky in others. The disk could be seen, but there was too much smoke to see any vessels. He was promptly put on Quertine with ascorbic acid and Hydergine. He was much better on his next visit, June 14. The fundus could be seen fairly well and the vision in the left eye was 20/40-2. On September 13, a vitreous appeared quite clear, and his vision was reduced to 20/200.

This patient has Kimmelstiel-Wilson's disease. We have had the misfortune to see several of these people. Briefly, this illness occurs in young adults who have had diabetes since childhood and who have elevated blood pressure, retinal changes of a diabetic sort, and evidences of kidney damage with casts. These patients were placed on Hydergine with no perceptible improvement. We have used stronger sedation with possibly some results, but it is too soon to know whether or not we can help them. This is a hideous disease which progresses to blindness and then to death after two or three years.

Case 5. Mr. O. H., a 67-year-old white man, was seen on September 22, 1955, at which time he stated he had high blood pressure. His right orbit and face had been injured when he was a boy, but the eye was not disturbed. His vision was 20/40 in each eye when corrected. On November 7, he told us that the vision in his left eye had suddenly become cloudy. Examination revealed 20/50 vision in his right eye and 20/40 in the left eye. Some fresh hemorrhage was noted in the region of both maculae plus a vitreous hemorrhage in the left eye. He was placed on 1 Hydergine tablet at bedtime and 1 tablet of Quertine with ascorbic acid before each meal. He got along quite well. His vision was about the same when he was seen again on December 28. He was maintained on this medication and at the date of this report, his vision remains about 20/50 in the right eye and 20/40 in the left. He is quite comfortable and reads well.

Case 6. Mr. S. H., a 24-year-old Japanese man, was first seen in this office on September 13, 1955, with an acute glaucoma in his right eye. The intraocular tension was right eye 58 Schiötz Sklar, left eye 17. He was put on 1 per cent pilocarpine every two hours and 1 tablet of Hydergine before bedtime. The tension was controlled, and on September 29, he was put on Hydergine 3 times a day, since we thought that part of his glaucoma was caused by his response under stress in his business. He was maintained on Hydergine for about six months, when the intraocular tension in his left eye went as high as 38 mm. Hg in spite of the surgery. The tension was brought down with pilocarpine. Hydergine was discontinued because we felt it was not helping him.

Case 7. Mrs. A. E. G., a 68-year-old white woman, said on her first visit, September 24, 1955, that her eyes had been watering and that they smarted and burned. Her vision was 20/20 in each eye, and she was wearing proper glasses. Her tear ducts were flushed and patent. She said that she was tense and did not sleep well, which she believed was due to the discomfort in her eyes. She was put on 1 tablet of Hydergine at bedtime and given a mentholated camphor eye wash to be used as needed. She felt much better when we saw her about two weeks later and volunteered that her eyes had stopped watering and that she was sleeping well. She was seen again on November 4, and appeared quite comfortable. She was still taking 1 Hydergine tablet at bedtime.

Case 8. Miss E. M. S., a 66-year-old white woman, was first seen on September 13. At this time, she said she had been elsewhere and was told that the vision in her right eye was permanently injured, that she had a membrane inside this eye, and nothing could be done for it. Whether or not she was told this is questionable. Our examination showed 20/50 vision in the right eye and 20/20 in the left eye with correction. There were some degenerative macular changes in her right eye; there was no change in the left eye. She was put on Hydergine and astringent local drops (Dionin 5 per cent).

When she returned on October 25, she said she was much better. On November 21, the vision in her right eye was 20/40. Retinoscopic examination revealed that no perceptible change had occurred since her first visit. She believed that she was much better and was convinced that she could see better.

Case 9. Mrs. P. J. N., a 69-year-old white woman, was first seen in this office on July 22, 1955. At this time, vision in her right eye was 20/30 corrected and 20/20 in the left eye. The right eye had a grey, droplet-shaped mass in the cornea which appeared to be a dystrophy of some sort and which depressed her vision a little. She was put on local medication and not seen again until September 22, when she said she was not happy and never been with her present glasses. She was most apprehensive about the depressed vision in both eyes. Examination at this time showed a vision of 20/40 in each eye, and the peculiar droplet-like greying dystrophy appeared in the center of the cornea of both eyes. She was reassured but was not satisfied, and she returned September 25. She was then reassured in reference to her blurring, and told to take Hydergine at bedtime. She telephoned a month later and said she felt much better and could see much better. She seemed to be really more comfortable. On subsequent visits, her cornea appeared unchanged to us.

Case 10. Mrs. B. T., a 66-year-old white woman, when first seen had 20/20 vision in each eye, but she complained that her eyes burned, scratched, and blurred when she read. There was no evidence of any pathology in either fundi and there was no corneal staining. However, Schirmer's test with strips of filter paper, 5 mm. in width, revealed tear production of about 6 or 7 mm. in five minutes. We felt this was inadequate. She was put on a solution of ½ per cent methylcellulose for artificial tears every two hours and Hydergine at bedtime. When seen again on November 16, she was much better and was advised to use the methylcellulose only as she needed it but to continue Hydergine. On her next visit, December 15, she volunteered no symptoms, was using methylcellulose only occasionally, and was quite comfortable. She is still taking Hydergine.

Case 11. Mrs. J. M. S., a 65-year-old white woman, was first seen on October 5, 1953, when she complained of innumerable symptoms. Her eyes burned and smarted; she could recite all manner of discomforts and seemed to be able to do so without ever coming up for air. She had been put on 3 gr. of Mebaral twice a day, but it did not seem to make much difference. She was put on both Hydergine and Tolserol, but they had little effect. Much time was spent listening to her describe these interminable symptoms amidst showers of tears; she had all sorts of numbness, pains in her head, and pains everywhere else. She was finally advised that we could do little for her. Hydergine did not help this woman.

Case 12. Mrs. W. B., a 58-year-old white woman, first came to our office on June 4, 1954. The vision in her right eye was 20/400 and 20/200 in the left eye. Retinoscopic examination through dilated pupils revealed extensive retinal damage with much sheathing of the vessels, many retinal hemorrhages, and some vitreous strands. It presented a picture which the British describe as vasculitis retinae. The damage to this woman's retinae was extensive and permanent. There was much fibrous scar. She was put on Hydergine and advised that she would be more comfortable. She was seen again in six weeks when she said she thought she could see a little better. Each time she comes in she seems quite cheerful, her face appears happy, and she apparently

gets around rather well with her peripheral vision. The fundae have not changed as far as we can tell. However, this woman is optimistic and is living with her malady a great deal better than she formerly did.

DISCUSSION

In reviewing these records, one of the great benefits of Hydergine appears to be its ability to make elderly people with incurable degenerative diseases comfortable. We tell these people that they will be happy and more comfortable when we put them on this medication. It is quite remarkable how content Hydergine can make them, and how it helps lighten the load of their infirmity, so that they begin to live with their problem and enjoy life. Hydergine is very use-

ful for people over 60 who have distressing symptoms associated with their eyes. These symptoms may be more the result of apprehension than changes in physiologic make-up, since people this age often know someone who is facing blindness or who has experienced great loss of vision. Although Hydergine offers these people a great deal of relief, it does not seem to act as a sedative. They are perfectly alert, do not seem sleepy, and their memory and motivation is not impaired. In our experience, Hydergine has definite limitations. It is of no value under the age of 60. We have also found that 1, or possibly 2, Hydergine tablets seem to be as effective as larger doses.

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SEVERE UVEITIS may be caused by streptococcal hypersensitivity. If inflammation is chronic or frequently recurring, desensitization with specific vaccines should be tried.

Hypersensitivity is detected by testing with stock vaccines and with vaccines prepared from organisms isolated from any foci of infection in the teeth, nasopharynx, sinuses, tonsils, or genitourinary tract of the patient. Incidence of hypersensitivity is about 85 per cent in patients with nongranulomatous uveitis but only about 27 per cent in those with granulomatous uveitis.

Vaccine is prepared from equal parts of all the strains of streptococci to which the patient is sensitive. An intravenous injection of a dilute concentration of the vaccine is given every four days. If no focal or systemic reactions occur, the concentration and amount of vaccine are gradually increased up to 0.5 cc. of a T-50 concentration of the organism, as determined electrospectrophotometrically. After this dose is reached, injections are given at weekly intervals for another six months.

Treatment completely relieves ocular inflammation in about 63 per cent of hypersensitive patients. In an additional 15 per cent, symptoms are somewhat decreased. Bacterial hypersensitivity and ocular symptoms may recur three months or more after cessation of treatment; vaccine injections may be repeated for these patients. Maintenance therapy is sometimes necessary after desensitization is accomplished. Treatment is unsuccessful in 22 per cent of patients.

ALAN C. WOODS, M.D. (Johns Hopkins University, Baltimore). *Arch. Opth.* 56:749-755, 1956.

Infant Feeding

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IN RECENT YEARS, much of the concern about infant feeding has disappeared. Fifty years ago, a discourse on this subject would have entailed deliberations which were necessary to the well-being or even the survival of infants who were denied their mothers' milk. Today we find common agreement about general principles which are recognized as successful for the great majority of infants. To be sure, differences of opinion about the relative merits of individual formulas remain, but the advantages claimed are generally so small that they must be backed with controlled experiments and involved statistical treatment. We owe to the science of bacteriology our knowledge of how to prepare formulas so that disease will not be transmitted; to biochemistry we owe our ability to concoct digestible feedings which satisfy the metabolic requirements for growth; and to modern food technology we are indebted for the convenient and relatively inexpensive forms of packaged infant foods. Perhaps, even more significant for the nutritional welfare of infants have been the constructive propaganda campaigns waged by public health and welfare agencies and by the medical profession through various media of mass communication which has created a widespread demand for advice and supervision in the rearing of infants. This desire of parents to reap the benefits of modern pediatric knowledge has achieved a level of infantile health which makes gross malnutrition rare in cities such as Chicago and Minneapolis.

A short time ago, the pediatrician's technic in feeding infants was practically a form of medical religion. It represented convictions instilled early in his training by a beloved and revered chief—convictions which he always defended with emotion if not with data. Indeed, one of the hazards of changing locations during pediatric training used to be the necessity of doffing the tenets of one nutritional cult and donning those of another. Surprisingly enough, the young pediatrician usually found that each of the different regimens worked very well in the hands

of its own devotees. Today, although many of us still rise to the defense of our favored technic, much of the fervor about infant feeding has disappeared. My position is that of a metabolic agnostic who doubts the necessity for many of the esoteric modifications of cow's milk. During the past dozen years, most of the babies at the University of Chicago Clinics thrived on a simple mixture of evaporated milk and water—40 per cent strength during the newborn period and then increased rapidly to a 50 per cent concentration in the first few weeks. No additional carbohydrate is added to the formula. Few infants require a more complicated preparation. Parenthetically, let me note that we are somewhat familiar with the proprietary preparations, since the children of the house staff thrive on free samples provided by the detail men. I do not question the adequacy of most of these preparations or of the many permutations which can be compounded in the kitchen, but I regard them as unnecessarily expensive or complicated.

The modern pediatrician's wide choice of many equally satisfactory preparations does not, however, lead to the conclusion that infant feeding has lost its importance. More significant than *what* the pediatrician prescribes is *how* he prescribes. The science of infant feeding may be standardized, but the art must be individualized. Indeed, the practice of this art is one of the most important phases of pediatric practice, since it is usually around infant feeding that two important relationships are developed—that between mother and child, and that between mother and pediatrician. Much of the anxiety about a new baby, particularly the first, centers in feeding and is the mother's chief motivation for seeking counsel. At this stage, the pediatrician is offered his maximum opportunity to gain her confidence and establish himself as a trusted advisor, an essential relationship if he is to wield his best influence over the mother's future care of her infant, not only in feeding but in other aspects of the child's management as well. These early contacts result in either the enduring confidence of

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mothers who have been well treated or the re-
criminations of those who feel that they have
received poor advice or have been misunder-
stood. This aspect of infant feeding rather than
the metabolic phases will be discussed in this
report. Attention will be directed primarily to
issues which the pediatrician must handle when
caring for the mother raising her first child, since
in this situation her anxiety is greatest, her ex-
perience least, her dependency upon authority
almost complete, and the pediatrician's oppor-
tunity is maximum.

PROBLEMS OF BREAST FEEDING

Perhaps, even before the child is born, the moth-
er and her pediatrician should consider the ques-
tion of breast versus artificial feeding. Mothers
who regard breast feeding as the natural and
obvious method of nourishing an infant present
minimum problems. But, the mother who ques-
tions or opposes breast feeding introduces an im-
mediate problem. While I am a strong advocate
of breast feeding, I learned long ago to be cau-
tious about the fervor with which I urge it upon
a reluctant mother. It is not always possible to
discover the reasons for her reluctance; in fact,
she often does not understand them herself. If
opposition to nursing is deep-seated, too much
persuasion may not only be fruitless but may
also strain the relationship between mother and
pediatrician by causing her to suspect that he
does not believe that she is a proper parent.
Augmenting the guilt which she may already
harbor over her aversion to nursing will not help
her as a mother later on. On the other hand, a
mother who is hesitant about breast feeding be-
cause of unreasonable fears can sometimes be
reassured with answers to her theoretic objec-
tions and can be encouraged to attempt an ex-
perimental trial. Success adds to her enjoyment
of the infant and bolsters confidence in her ma-
ternal abilities.

Sometimes maternal attitudes toward breast
feeding are complex. One of my patients, a
former nurse, breast fed all 3 of her children.
She experienced multiple feeding difficulties with
each child, partly real and partly imagined, and
maternal anxiety and uncertainty continued until
the child was weaned. She then became calm
and confident. She recently proved her mettle
by carrying her family skillfully through the sud-
den loss of their father. In this case, I believe
that the mother's intellectual convictions and
previous training impelled her to breast feed in
spite of her emotional aversion. I do not think
her internal struggle was worth it. This dissocia-
tion between intellectual conviction, which re-

gards breast feeding as essential, and emotional
feeling, which makes it repulsive, is not uncom-
mon among the intelligent women of our univer-
sity community. Frequently, the mother con-
trives some acceptable excuse for giving up the
attempt to breast feed, but sometimes she is bur-
dened with so many confusions that the pedia-
trician is wise to step in and assume the respon-
sibility for a decision to wean the infant.

One mother presented an unusual reaction to
breast feeding by displaying almost frantic anx-
iety for reassurance that she would be physically
able to nurse her first baby. The peculiar urgency
of her desire to nurse stimulated an inquiry into
its basis. The patient revealed that she was an
adopted child reared by foster parents who mas-
queraded as her real parents. When the decep-
tion was disclosed during her early adolescence,
she reacted so violently that she fled the foster
parents and married within a short time. After
a series of spontaneous abortions, she finally
achieved this first baby by spending most of
the pregnancy in bed. Since the child repre-
sented her only known biologic kin, she was
frantically anxious to be a proper mother. After
she discussed her feelings, the issue lost much
of its importance, and, when she ultimately
proved unable to produce enough milk, she ac-
cepted the transition to artificial feeding with
calm resignation.

Thus, it seems to me unwise for the pediatri-
cian to champion an arbitrary attitude toward
breast feeding. While encouraging mothers who
are so inclined or timorously doubtful, he must
also be prepared to admit its undesirable aspects
for those who find it too upsetting. He may even
have to provide convenient excuses for the wom-
an whose sense of obligation outstrips her emo-
tional comfort in nursing. Since the pediatrician
must often adopt a stand toward this problem
before he is intimately acquainted with the
mother's feelings, it is usually wise to sound out
her attitudes before offering too much advice.

EARLY TRAINING

As he guides infant feeding, the pediatrician
must be solicitous not only of the mother's feel-
ings but of those of the infant as well. A confi-
dent and relaxed mother who ministers reassur-
ingly to the needs of her child provides the ideal
foundation for a happy mother-child relation-
ship. Conversely, the seed of long-range mal-
adjustment may be sown in early conflicts be-
tween an infant's legitimate needs and his moth-
er's arbitrary refusal to meet them. The pediatri-
cian influences maternal attitudes toward feed-
ing by the manner in which he issues early in-

structions, by his interpretation of existing difficulties, and by the way in which he expresses his suggestions for future handling. Through such contacts, his basic philosophy of infant rearing is transmitted to the mother in a measure varying with her degree of dependence upon him. To Dr. Andy Aldrich we owe the leadership which has changed the arbitrary scientific regimentation of the past to the flexible management which today recognizes the variability among infants and the wisdom of catering to their individual peculiarities. As Dr. Aldrich's influence has spread, increasing numbers of physicians have ceased attempts to legislate either hunger or its periodic satisfaction, and, as a result, the incidence of infantile feeding problems has happily declined.

This major change in emphasis probably requires no defense before a group of modern pediatricians. However, it is appropriate to consider some of its immediate and secondary effects. From the infant's point of view, the mother is established as a dependable source of gratification for the physiologic and emotional discomforts of his waking hours, a role which she must play consistently through his formative years. Women who are well endowed with maternal instincts fall easily and naturally into this role and require only a little encouragement as reassurance. But, our modern culture with its values on efficiency, emotional control, and intellectual pursuits is leading many women into a way of life that makes the raw biologic demands of a small infant difficult for them to sympathize with and tolerate. Higher education, professional training, economic independence, and the pursuit of the arts, letters, and the social graces are laudable objectives for the woman of today. At the same time these pursuits may postpone the age of childbearing and cause a woman to become jealous of invasions upon time which she might otherwise use to function as a skilled member of society. These conflicts are usually revealed when feeding is discussed. The pediatrician does not help such a mother best by initiating a series of formula modifications and medications designed to correct the infant's behavior. This approach merely avoids the real problem which again emerges at a later period of the child's life. Better results are achieved by sympathetically accepting the mother's struggle as natural and one which she can best resolve by understanding her own feelings, while still recognizing and honoring the rights of her infant. A relationship between mother and pediatrician founded early on this kind of frank and sympathetic realism can readily be used to meet later

problems of weaning, sleeping, toilet training, and discipline.

The didactic feeding methods so much in vogue a generation ago grew out of excessive enthusiasm for the scientific approach to infant nutrition. These ideas still lurk in some lay treatises on infant care and in the minds of the grandmothers who reared today's parents in this fashion. The precision and apparent logic of this approach appeals to many of the current generation of mothers who have been raised in an era of efficient mechanical devices. A mechanistic view tends to be enforced when feeding schedules are too arbitrary. The error in didactic feeding lies in too narrow an interpretation of normal requirements and behavior, which sets up "the average" as a standard toward which each infant must be impelled. The more relaxed modern method permits the infant to declare his own peculiarities and encourages his mother to recognize and understand them. Under this system, the pediatrician functions primarily as a judge who decides when the bounds of reasonable variation are exceeded. In this way, the mother learns to accept her infant's vagaries not only in regard to feeding but also in later phases of his development and behavior. Thus schooled in feeding, she will probably accept temper tantrums more tranquilly; approach toilet training in a pleasantly experimental manner; and accept reassurance about minor deviations from the usual pattern of physical development. The method is also valuable in building the mother's confidence in her own judgment, since she is forced to make her own decisions early and to free herself from slavish dependence upon her pediatrician. The early acquisition of such self-confidence is a realistic necessity.

As with any general method, exceptions in its application must be expected. An ignorant mother may not be able to nourish her infant without detailed and specific instructions, or a compulsive mother may be so uncomfortable with flexible instructions that a definite routine may have to be planned until she is able to relax. More important than these specific failures is the danger that mothers may accept the permissive approach of the method so completely that they continue to manage their infants in this fashion indefinitely. Psychiatrists who in the past traced many forms of emotional maladjustment to unsympathetic handling during the first two years of life are now suggesting that the pendulum may have swung too far in the direction of *laissez faire*. A factor in juvenile delinquency is thought to be the failure of parents to set proper limits on behavior appropriate to

the child's stage of development. In this last qualification lies the nub of the problem — that parents must play a role which changes as the child matures. In early infancy, cuddling, pampering, and catering to the infant's whims help him adjust to extrauterine life. If he can develop a satisfying relationship with his mother in this way he will be better equipped to accept the irritations and frustrations which she must impose upon him in later life as she helps him control his behavior and conform to the necessities of the physical and social world around him, including the formation of a conscience and learning consideration for others. Thus, even as we encourage mothers to let infants have their own way about feeding, we must be sure they understand that later on appropriate firmness and direction will be required, first in matters of personal safety and later in social relationships.

I have spent so much time discussing philosophic attitudes toward feeding that I shall only be able to mention briefly a few specific practical problems.

COLIC

No discourse on feeding is complete without mentioning colic. The term does not connote a single entity. Many infants so classified seem to respond in an unusually vigorous manner to stimuli originating both in the external environment and in their own gastrointestinal tracts. The response is usually of the "all or none" character in that the infant passes rapidly from peace to angry, vigorous protest. Because this violent reaction often ceases abruptly some time during the first three to four months of life, I have wondered whether such babies were not born with some variety of immaturity of the nervous system which corrects itself early in postnatal life. In my experience, drugs have little effect upon this hypersensitive behavior, but admittedly I have not tried the newer tranquilizing agents. Rather than prescribe the round of formula modifications which usually prove fruitless, I offer parents reassurance, sympathy, and the probability that improvement will occur within the early weeks. To minimize the disturbance which they must endure, I suggest that they act

promptly when the infant requires food or diaper changes, provide as quiet and peaceful a household as possible, handle the infant with slow movements, and give him extra solace with cuddling and some kind of a pacifier.

SOLID FOODS

The controversy about when to introduce solid foods into the infant's diet is more of an educational than a nutritional nature. It has been well demonstrated that infants can tolerate many types of exotic foods even during the first two weeks of life. It also seems clear that milk and vitamins support normal growth until the infant begins to run out of iron during the latter half of the first year. I favor starting solid foods during the first six to eight weeks, not so much because of their nutritional value as for the education of both mother and baby. To the mother, early spoon feeding with a variety of foods has the psychologic effect of encouraging her to see her baby as an individual progressing toward 3 meals a day. It forestalls the inclination of some mothers to want the tiny baby to remain forever infantile. At the same time, the infant's palate becomes accustomed to the taste and feel of a variety of foods and to the technic of spoon feeding long before he begins to resist the introduction of new items into his diet, a common characteristic after the age of 6 months. The ages at which cup feeding and finger feeding should be encouraged and the use of a bottle discouraged are extremely variable from one infant to another, or perhaps from one mother-infant combination to another would be more accurate. A little encouragement is usually necessary to help the new mother tolerate the mess made by her baby and offer him a chance to try out his abilities. In these operations, too, the approach should be that of gentle experimentation backed with a good maternal sense of humor.

In this unorthodox discussion of infant feeding which has used neither the word "calorie" nor the word "protein," I have attempted to analyze the art of guiding a new mother. If I have helped clarify some of the attitudes which are instinctively adopted in this phase of child guidance, I will have succeeded in my objective.



Notes from a Medical Journey

September 18, 1956

Dear Jay:

After flying from Moscow to Stockholm for the European Cardio-logical Congress, we have been traveling east again and now in Juuka we are only a few miles from the border of Russian Karelia. In Ilomantsi, where we work later this week, we shall be so close that we must be careful not to stray too far on our after-supper walks. But, there is less fear of the Russians here than in Minnesota. The Finns, after centuries of contact --and conflict--with a difficult neighbor are neither fearful of tough gestures nor beguiled by recent blandishments. Anyway, all is calm and our work goes smoothly.

We are staying at the home of Dr. Paavo Kinnunen and his charming wife. The laboratory is nicely set up in a spare room of the new Juuka school, and the subjects are examined in the local health center across the road. This morning we ended up with 27 farmers plus 6 of their wives who came along uninvited. There is no problem of getting good samples of the population. The preparatory work of the dietary team and much publicity in the newspapers paved the way so well that everyone wants to be counted in.

So, Flaminio (Dr. Fidanza of Naples) and Miss Airi Leets are pipetting serum, our friend and amanuensis, Martti (Dr. Karvonen of Helsinki), and his assistant, Miss Eila Ala-Ketola, are transcribing data, and I take time to write a bit. A warm sun is slanting across the windows and the birch trees glow yellow-gold among the dark masses of the firs and spruces that clothe the gentle hills stretching on to the end of sight. In the foreground, across from the school yard, are houses built of hand-hewn logs standing on the edge of a field dotted with small haycocks, so the scene is rural indeed.

The Stockholm Congress gave us sunshine too and I was tempted to wander in the city streets and parks instead of attending the sessions. However, conscience triumphed so I saw little of Stockholm. I gave a resume of some of our findings in Japan and at the close of the session, I received invitations to lecture and organize research in Yugoslavia, Israel, Austria, and Czechoslovakia!

At this same session, Dr. Toor of Israel reported on different diets of Jews in Israel. It seems to be clear that coronary heart disease is rare among the Yemenites until they change from their traditional low-fat diet to the high-fat diet of the Askenazi (Jews of Europe and America). The serum cholesterol values correspond to the dietary pattern.

Also, during this same session, Dr. Irving Page from Cleveland was asked to say a word and managed to create a minor sensation. He spoke off the cuff about the report, to be published shortly in "Circulation," of the collaborative study on the ultracentrifuge method versus cholesterol measurement for the prediction of coronary heart disease. After three years and maybe a million dollars or so, the conclusion, unhappily for Gofman, is that his fancy " S_1 " numbers are no better than simple cholesterol concentration. I recall the scorn I received when I said the same thing three years ago, but now it is official.

The job here in Finland is to compare the peoples of western Finland with those of the east, the starting point being the information that here in the east the incidence of coronary heart disease is far higher than in the western part of the country. This means comparing the diets, blood cholesterol, obesity, and so forth, as well as checking on the mortality and morbidity figures. Fortunately, the Finnish vital statistics and hospital records are unsurpassed anywhere for accuracy and completeness and to these will be added clinical surveys by a team from Helsinki led by Professors Paul Soisalo and Pentti Halonen. Finally, a study will be made in Helsinki itself, including an analysis of a great series of autopsies.

The first dietary phase, directed by Professor Paavo Roine, is finished but the data are still being analyzed. Fortunately, there is sufficient detail to provide data on the different types of fatty acids in the diet, and it may be that in this respect, rather than in simple total dietary fat, that a critical difference between regions of Finland will emerge. So far the data are suggestive.

As for the frequency of coronary heart disease, we can testify that there is no dearth of patients in Finland. We saw 3 times as many cases in a morning in the Kivela hospital as we saw in five weeks in Japan. Also, here it appears that cerebral thrombosis is more common than cerebral hemorrhage. In Japan, it is very much the other way around. This question deserves a lot more study and I hope that Professor Lauri Kalaja of Helsinki will contribute to this, as well as our friends Professor "Jack" Davies in Uganda, Dr. Noboru Kimura in Japan, Professor J. F. Brack in Cape Town, and others. The way it stands now it seems that the frequency of all forms of thromboembolic phenomena in populations is pretty much directly proportional to the frequency of coronary heart disease in those populations. I suspect they share the same etiology, at least in part.

As I have said a dozen times before in these letters, this type of epidemiology is only in its beginnings. There are plenty of headaches, including pitifully small funds and help to do a big and difficult job, but

I think by now it is hard to deny that significant results are emerging. And, I think the accomplishment to be gained in this way in promoting international cooperation and understanding among doctors and medical scientists also will prove to be significant. Anyway, we find fine friends and collaborators all over the world, and I am getting a first-hand view of world medicine at the grass roots.

The foregoing paragraph is the result of sitting here thinking about all the research that ought to be done, all the things I want to do, and the obstacles to be overcome--obstacles of apathy, ignorance, and the proprietary attitudes of certain groups about areas of research, as well as my own personal limitations. Hence, the interpolation of "this I believe" may be understood.

In a few weeks, I shall be in California and then, after a hasty study on California Japanese and lectures there and in Oregon, I shall be home, having missed the part of the year I like best in Minnesota. Right now the countryside here looks like Minnesota, except that there are more lakes and far more forests, but I miss Margaret and the children and all my good Minnesota friends. And I fear I cannot learn to speak Finnish!

As ever,

A handwritten signature in cursive script, reading "Ancel Keys". The signature is written in dark ink and is positioned to the right of the "As ever," text.

Convulsive Disorders in Children

THERE IS NEED for physicians to take a new look at convulsive disorders in view of their prevalence and also in consideration of recent advances in diagnosis and therapy. General practitioners and pediatricians should be especially aware of new developments in diagnosis and treatment, since 90 per cent of convulsions have their onset in infancy or childhood. They occur in about 1 out of every 200 individuals, so that there are a number of people with convulsive disorder in every community.

In order to properly treat a convulsive disorder, one must be cognizant of its type as well as of the underlying cause. In infants under 2 years of age, the greatest likelihood is that convulsions occur because of birth injury or gross developmental brain defect. Infrequent but possible causes of convulsions in infancy are tetany in the neonatal period, tetany associated with rickets, hypoglycemia, febrile convulsions, brain tumor, meningitis or encephalitis, Sturge-Weber syndrome, subdural hemorrhage or effusion, or idiopathic epilepsy. Cryptogenic or idiopathic epilepsy is the most common cause of recurrent convulsions in older children, most often appearing between 4 and 8 years of age, although onset may occur at any age. Most of the causes of convulsions mentioned as occurring during infancy may also begin later in childhood, although less frequently. Conditions which must be differentiated from convulsions are breath-holding spells, fainting spells, tics, narcolepsy and cataplexy.

In the diagnosis of convulsive disorders, a careful history and physical examination are of primary importance, even more so than the electroencephalogram or pneumoencephalogram. A physician can usually diagnose primary or secondary epilepsy from the history and physical examination alone. This does not mean that other diagnostic tests should be disregarded. For example, if a child has recurrent convulsions beginning under 2 years of age, one should always determine a fasting blood sugar, serum calcium level, serologic test for syphilis, and do a spinal puncture, pneumoencephalogram, as well as subdural taps if there is any fullness of the fontanel or enlargement of the head. Electroencephalography is optional at that age if a gross brain defect or a chemical defect is found as a cause for the convulsions. In older children, the pneumoencephalogram can usually be omitted if the convulsions are

typical of the idiopathic type, and if a skull roentgenogram, optic nerve examination, electroencephalogram, and blood chemical findings give adequate information. Cerebral arteriography visualizes vascular anomalies and some tumors and is carried out in selected cases. Electroencephalography has been emphasized so much in the diagnosis of convulsions and, in fact, of all cerebral lesions that the fact should be pointed out that it is not always infallible and that the electroencephalogram is normal in approximately 20 per cent of cases of grand mal epilepsy and 10 per cent of cases of petit mal epilepsy. It is not invariably reliable in cases of brain tumor either.

Convulsions are usually classified as either grand mal or petit mal. The grand mal convulsions are characterized by loss of consciousness of varying duration with either tonic rigidity, clonic jerking movements, or both. The grand mal seizures may also be atonic in type. They may be either nocturnal, diurnal, or both. At the end of a seizure, the patient usually goes into a deep sleep for an hour or two which is followed by lassitude of several hours' duration. Grand mal convulsions may be generalized or focal; in the latter instance, the possibility of localized organic brain involvement is greater, but a certain percentage of idiopathic epilepsy is also focal in type. Petit mal epilepsy is characterized by momentary loss of consciousness with staring or rolling of the eyes. In some cases, clonic movements of the head or eyes may occur. The petit mal spells usually occur numerous times daily and are not associated with any postconvulsive phenomena. The patient resumes whatever he has been doing just prior to the attack. Livingston and others differentiate minor motor seizures from petit mal epilepsy on the basis of difference in the type of seizures as well as a difference in the electroencephalographic findings. Minor motor seizures are of short duration and may be either akinetic or massive myoclonic in type. Minor motor seizures carry a much more serious prognosis than petit mal. Psychomotor seizures have received much attention recently, as they have been found to be associated with temporal lobe lesions which, in some cases, are amenable to surgery. These seizures are characterized by clouding of consciousness with bizarre behavior and automatic activities. Such spells are often difficult to differentiate from behavior

problems or temper tantrums. Another type of seizure which deserves mention is the abdominal seizure in which abdominal pain is the chief complaint, usually followed by postconvulsive sleep and exhaustion.

Electroencephalography cannot be discussed in detail here. Suffice it to say that there are typical changes in the brain waves in epilepsy and other cerebral abnormalities. The changes in petit mal are most characteristic, consisting of 3 per second spike and dome waves. Grand mal epilepsy is associated with irregular spikes or slow abnormally large rounded waves which may come in bursts during seizures. The abnormal changes in the electroencephalogram can often be elicited by sleep, hyperventilation, Pirressin and overhydration, or photic stimulus, such as from bright flickering light. Some clinically normal individuals have abnormal encephalographic findings, whereas a small percentage of those with a convulsive disorder may have normal encephalographic findings. The normal brain wave pattern in infants and small children is not the same as for older children and adults.

Drug therapy is the backbone of management of the convulsive patient, and it is in this field that the most striking advances have been made during recent years. Before 1938, bromides and phenobarbital were practically the only drugs available for convulsions. Since the discovery of Dilantin sodium in 1938, a number of drugs have been developed for both grand mal and petit mal seizures. For grand mal, the best drugs at the present time are phenobarbital, Mebaral, Dilantin sodium, Mezantoin, Mysoline and Phenurone. For petit mal, Tridione, Paraldehyde, Milontin, amphetamine, and Diamox have all been found effective. There are a number of other drugs effective in the treatment of convulsions, but those mentioned are generally considered the best, although some produce side effects which require precautions, such as repeated blood counts or urinalyses. These drugs are used in combination in selected cases. The dosage must be regulated to the individual patient, although the accepted dosage for all of these drugs are outlined in any good textbook on convulsive disorders. It is obviously impossible to elaborate on drug dosage, but I would like to refer the reader to the excellent book by Dr. Samuel

Livingston, associate professor of pediatrics, the Johns Hopkins medical school, and director of the Johns Hopkins Hospital epilepsy clinic, entitled "The Diagnosis and Treatment of Convulsive Disorders in Children." This is a practical and complete book covering all phases of convulsive disorders in a clear-cut way, and would be a valuable addition to the library of any pediatrician or general practitioner and all other physicians interested in convulsive disorders. Dr. Livingston is scheduled to speak at the annual meeting of the North Dakota State Medical Association in May of this year. His talk should interest all physicians in North Dakota.

In addition to drug treatment of the epileptic child, other factors must also be considered, such as diet, social and emotional factors, education, and employment in the older age group. The ketogenic diet has been used successfully by some in the treatment of epilepsy but is difficult to carry out and regulate. Diet in general has no particular bearing on the occurrence of seizures, although dietary excess is contraindicated as is excessive fluid intake. With regard to social factors, one may say that the convulsive child should be kept in a normal environment to as great an extent as possible. This includes attendance in regular school classes, physical education, and participation in athletics. There is no evidence that increased physical activity aggravates a convulsive tendency. Emotional tension is known to aggravate the frequency and severity of convulsions, and psychiatric advice is occasionally desirable. Education and employment depend largely on the mental capacity and the degree of control of the convulsions, but services should be available in most communities to help the convulsive patient attain the most normal life possible. In patients in whom medical management is not successful, surgical treatment should at least be considered. This is particularly true if seizures are focal in type if the electroencephalogram shows focal abnormal activity. The pneumoencephalogram may or may not show a gross defect. Penfield and Steelman report 50 per cent relief from convulsive seizures with surgical removal of convulsive foci in carefully selected cases.

L. G. PRAY, M.D.

Fargo, North Dakota

American College Health Association News . . .

The Student Health Service at the University of Delaware moved into its new building, Laurel Hall, on December 8, 1956. The 28-bed infirmary is the gift of a private donor.

Dr. Gordon Keppel, director of the Student Health Service, says that Dr. Dana Farnsworth's influence has been a tremendous help in achieving this long step forward. Dr. Farnsworth spoke at the convocation marking the opening of the building.

Miss Muriel Farr, R.N., Chairman of the Nursing Committee of the A.C.H.A., has agreed to act as consultant in setting up nursing procedures in the new and larger quarters.

Dr. E. H. Hudson, formerly director of Student Health

at Ohio University, Athens, is presently traveling in Scotland. He will be back in Cedar Grove, Wisconsin, this spring. Dr. Hudson reached retirement age in June 1955, and was replaced as director of Student Health by Dr. E. L. Schmidt.

Dr. Charles E. Klontz, formerly with the Student Health Service at Rockford College, Rockford, Illinois, is presently establishing a Student-Staff Health Program at the Christian Medical College Hospital, Vellore, India.

Dr. John H. Whitmer has been appointed director of the Student Health Service at the University of Wyoming, Laramie. Dr. Whitmer assumed his duties January 7, 1957.

Ulcers of the Legs, by PEDRO PU-LACHS, M.D., chief professor surgeon in the Faculty of Medicine of Barcelona, 1956. Springfield, Illinois: Charles C Thomas. 574 pages, 303 illustrations. \$22.50.

This is an extremely interesting and provocative manuscript that outlines a tremendous experience in peripheral vascular disease, and noticeably ulcers of the legs. The outline of physiopathology of venous insufficiency is excellent. The author believes that all varices are the result, directly or indirectly, to the existence of arteriovenous communications. The neurotrophic factors associated with extremity ulcerations and their management is well discussed.

Whether the theories are as absolute as the manuscript presents or not is open to discussion. However, they are presented in such a fashion that the student of vascular diseases will find much of value to stimulate his interest. It is well written, excellently illustrated, and easy to read.

THOMAS O. MURPHY, M.D.

The Pediatric Years—A Guide in Pediatrics for workers in health, Education and welfare, by LOUIS SPEKTER, M.D., director of Bureau of Maternal and Child Hygiene, Connecticut State Department of Health, 1956. Springfield, Illinois: Charles C Thomas. 734 pages. \$12.50.

This is a general reference book not intended for physicians or nurses alone, but as an aid to all workers allied to physicians in understanding problems affecting the sick and well child. It is principally technical and designed for nonmedical members of groups who work with children,



such as social workers; physical and occupational therapists; nutritionists; teachers; public health, hospital, and office nurses; dentists and dental hygienists; mental hygienists and psychologists; health educators; sanitation engineers; staffs of child care centers and nursery schools; teachers of the handicapped; medical and x-ray technicians; medical secretaries; and students in various professional fields. The book consists of 6 sections.

Section I deals with the "optimum health" of children as related to their inborn health. This section begins with the health of the expectant mother and the maternal illnesses that may harm the growing and developing embryo.

Section II is concerned with the "optimum health" dependent upon an understanding of how children grow and develop. This is a rather detailed description of the normal and what is considered "optimum."

Section III deals with the "optimum health" as it relates to illness and discusses (1) diagnosis of children's diseases in the hospital, outpatient department, and private practice, (2) distribution according to diagnosis in specialized medical care programs, (3) relative effects

of diseases on growth and development, and (4) requirements for care in certain illnesses, medical, social, educational, and other community services.

Section IV is concerned with the "optimum health" dependent upon professional workers and facilities. This section tells of the many skills important to child health and refers to standards of qualifications for those providing care.

Section V deals with "optimum health" in regard to standards of service. This is a discussion of the kind of people and physical facilities a convalescent home needs to provide the convalescent child with adequate care. The reader is also told how to judge the health aspects of camps where children may spend many weeks of their lives.

Section VI is concerned with pediatric procedures and a glossary. This section is of particular value to those who must explain to patients and parents some of the problems in the care of the child. It also contains definitions of commonly used medical terms. Community aspects of disease are discussed as they relate to a particular disease rather than referring to the chapter on the responsibility of the community in health and disease. Excellent sources are quoted and many consultants of high standards have collaborated in offering information.

The book as a whole avoids the heavy technical words employed in pediatric textbooks and will be very useful for health workers. It offers information on all aspects of child health in a form that is easily understandable and "suited to the individual worker's needs."

E. S. PLATOU, M.D.

The Journal Lancet

SERVING THE MEDICAL PROFESSION OF MINNESOTA,
NORTH DAKOTA, SOUTH DAKOTA AND MONTANA

PREFACE

to Special Section on Sports Medicine



THE AMERICAN COLLEGE OF SPORTS MEDICINE was organized in 1954 and is an affiliate of the Federation Internationale Medecine Sportive, whose world headquarters are in Rome, Italy.

Its membership comprises physicians who are specialists in those fields of medicine particularly concerned with the effect of strenuous physical activity on the human body; physiologists; educators; and experts in health, physical education, and recreation.

It is obvious that the greatest good can be obtained by pooling and applying the experiences of these specialists wherever indicated.

The Board of Trustees takes this opportunity to express their appreciation to the editorial board and management of THE JOURNAL-LANCET for devoting this issue primarily to articles which deal with sports medicine.

Unfortunately, space does not permit the publication of many valuable contributions submitted at this time. This, we hope, will be the first of a series devoted to the important subject of sports and medicine. The readers comments and suggestions will be greatly appreciated.

JOSEPH B. WOLFFE, M.D., *President*
American College of Sports Medicine

Valley Forge Heart Hospital and Medical Center
Fairview Village, Pennsylvania

The Heart of the Athlete

JOSEPH B. WOLFFE, M.D., F.A.C.S.M.

Fairview Village, Pennsylvania

THIS PRESENTATION is based on observation of 800 high school, college, amateur, and professional athletes conducted for the past quarter of a century. Among them were football and basketball players, oarsmen, cross-country, track (100 to 800 yards) and marathon runners, speed skaters, and tennis players. Approximately one-third could be classified as outstanding in at least one sport. Many were rechecked periodically.

Our procedure of study has been a detailed athletic and medical history; physical examination with special reference to heart size, sounds and rhythm; pulse rate; blood pressure; electrocardiographic and ballistocardiographic curves; vital capacity; and breath-holding time.

Heart size. The frequent reference to the so-called "athletic heart" interested us in particular, because of an impression that competitive athletics may produce pathologic enlargement of this vital organ. Physical examination of the heart was not found to be sufficiently accurate for the purpose of comparing cardiac size in the same athlete at repeated intervals. From a scientific point of view, at best it may be considered but a rough estimate. The roentgenologic shadow, despite minor changes in size depending upon phases of respiration and/or cardiac cycle at the time of x-ray exposure, is most reliable in ascertaining cardiac size and shape. We found that the transverse cardiac diameter and the frontal heart area, determined teleroentgenologically, do not parallel each other. Our material did not lend itself to accurate determination of the anteroposterior diameter. The measurements were compared to those obtained in the average person of the same height and weight. Striking variations were found between the actual and the predicted transverse diameters as well as the frontal heart areas.

JOSEPH B. WOLFFE is president of the American College of Sports Medicine, medical director of Valley Forge Heart Research Foundation and Wolffe Clinic, Philadelphia, chairman of the Postgraduate Education Committee of the American College of Cardiology, and author of many scientific articles.

Measurements of the *transverse diameter* were found to be above 10 per cent of the predicted measurements in 23 per cent of athletes between the ages of 14 and 21 years. In 51 per cent of this group, the *frontal heart areas* were above 10 per cent of the predicted size.

In 22 per cent of the age group from 20 to 39 years of age, *transverse cardiac diameters* with more than +10 per cent increase over the predicted averages were found, while 50 per cent of these individuals showed an increase of *frontal heart areas* of more than 10 per cent over the predicted measurements.

In the age group from 39 to 60 years inclusive, there was more than 10 per cent deviation of the *transverse diameters* in 29 per cent, while 42 per cent had more than +10 per cent increase in the predicted *frontal heart areas*. Deviations varying below and under plus and minus 10 per cent were disregarded (table 1).

TABLE 1

Age group, years	Transverse cardiac diameters with greater than +10% deviation from predicted average	Frontal heart areas with greater than +10% deviation from predicted average
14 to 20	23%	50%
20 to 39	22%	50%
39 to 60	29%	42%

Comment: Deviations between plus and minus 10% from the predicted average have been disregarded.

Among the 3 age groups, there were nearly the same number of athletes who had smaller hearts than their predicted norms. In some instances, the transverse cardiac diameter was as much as 15 per cent below the expected measurements and 22 per cent less than the predicted frontal heart areas.

The range of the frontal heart measurements varied greatly in individuals of the same somatotype, age, height, and weight. The figures compare rather favorably with previously published data.¹ In a sense, it may be stated that the variations are somewhat similar to the variations in size of a nose, hand, and foot in different individuals.

Comparative roentgenograms taken over a number of years on 168 athletes, who continued their activities, failed to show any constant relationship between expenditure of physical energy and heart size; nor was there any evidence that those with the largest transverse diameters or frontal heart areas were among the top athletes.

Large hearts in champion athletes have been reported in the literature. However, it has not

been established whether this was part of their individual pattern starting with birth or has been acquired as a result of strenuous exercise. Our data, so far, neither confirm the one nor contradict the other.

Judging from the results found in vigorously exercised greyhounds, horses, and rats, some degree of hypertrophy must be expected. Cardiac hypertrophy in the athlete, if present, is undoubtedly of the concentric type which cannot be demonstrated in the living subject with our present-day methods.

The dilated heart of disease, however, is easily demonstrated roentgenologically. Among the active athletes whom we were privileged to study, there was not one instance of cardiac dilatation. This includes a large group x-rayed immediately after strenuous activity. Among these were many who were studied at a point near exhaustion. As a matter of fact, a reduction in heart size immediately following strenuous competitive activity was found in 73 per cent of top athletes, with return to pre-exercise measurements in approximately ten minutes.

Follow-up studies of the youngest age group (14 to 20 years) were also inconclusive. A slight increase in cardiac size was found in some, while in others there was some decrease. The figures, however, are not impressive enough considering possible technical variations. Among the youngest, only growth was a factor which correlated with the increase of cardiac shadow. This was proportionate to the increase in height, weight, and chest diameter.

An unexpected increase in heart size was found in 17 athletes of various ages during a five-year period. Their histories revealed recurrent upper respiratory infections. Further investigations along these lines may be worthwhile.

Auscultation of the heart. In 4 per cent of the examined athletes, a transient systolic adventitious sound was heard over the third left costosternal junction which became more pronounced after strenuous physical activity. In 3 per cent of athletes, murmurs appeared following exertion. Innocent cardiac arrhythmias were found in some, while reduplication of the second heart sound was a fairly common finding.

Pulse rates. The majority of athletes have slow resting pulse rates. There are many exceptions. A sinus bradycardia of 52 per minute was found in an oarsman. Two marathon runners had a resting sinus tachycardia of 120 and 130 per minute, respectively. The runner with the pulse rate of 120 per minute finished with a rate of 133 per minute after a run of 26.4 miles on a cold, snowy February day. The other had a pulse

rate of 144 per minute after a run of 26 miles on a warm spring day. The following personal communication which I received from Dr. Paul D. White concerning pulse rates in athletes is noteworthy.

October 2, 1956

Dr. Joseph B. Wolffe,
Valley Forge Heart Institute and Hospital
Fairview Village, Pa.

Dear Dr. Wolffe:

Thank you for your letter and the reprint about Marathoners.

I made a somewhat similar interesting finding a good many years ago concerning the heart rates of marathon runners before and after a race. It was published in the *Journal of the A.M.A.*, September 28, 1918, volume 71, page 1047. It was entitled, *The Pulse After a Marathon Race*.

The tests were actually made in 1915. The rates ranged, before the race started, between 64 and 118. At the end of the race, the pulse rates ranged from 80 to 136. The man who won the race in good condition had a rate of 118 at the starting time, and it was 110 after running the 26 miles. If we had ruled him out because of his pulse before the race, we would have ruled out the winner.

This is in accord, of course, with your other findings concerning the range of the normal heart which I have emphasized in Chapter 2 of my textbook on *Heart Disease*. You will find a number of variations recorded there.

Sincerely yours,

Paul D. White

Marathon and long distance runners of all ages with the fastest pulse rates before an event completed the race with placement figures comparable to those with slow pulse rates. Therefore, pulse rates would seem to have no relationship to performance.

Blood pressure. We found the average blood pressure in athletes ranged between 110 to 160 systolic and 65 to 100 diastolic. Immediately following strenuous exertion, there is an increase in systolic pressure and/or a fall in diastolic pressure resulting in *increased pulse pressure*. This phenomenon is commonly seen in top athletes. After vigorous training, the increase in pulse pressure seems to be greater. The time required to return to pre-exercise levels does not seem to bear any influence on performance.

The electrocardiogram. Sinus arrhythmia was a common electrocardiographic finding. Occasional ventricular asystoles were seen. Ectopic beats either ventricular, auricular, or nodal in origin were also encountered. These irregulari-

ties disappeared following physical effort and reappeared at rest. While most of the arrhythmias were found during physical examination, the electrocardiogram showed the focus of the ectopic beat. None of the athletes examined had ectopic beats arising in multiple foci. A few were conscious of an irregularity of the heart beat and described it as a "dropped heart beat," "skipped beat," "sudden jumping of the heart," or "my heart turned over." However, the majority was unaware of the cardiac irregularity, and, in these cases, we found it best not to call it to the individual's attention.

T-wave changes, particularly in the thoracic leads, were found in all age groups. Some T-waves were inverted, others diphasic. In some, the T-wave changes appeared after effort, while in the few who had pre-exercise T-wave changes, the T-waves became more normal.

A young top runner from Penn State University was referred to us because of a congenital right-bundle-branch block which was neither influenced by exertion nor rest. Another young runner, who also played high school and college football, showed persistent widening and notching of QRS-complexes in the absence of clinical evidence of heart disease. We have had the opportunity to follow him for the past seven years.

Incidences of this type underscore the necessity for interpreting the electrocardiogram in the light of clinical findings and particularly in relation to physical performance.

The Ballistocardiogram. Ballistocardiography is the most recent addition to the methodology

for the study of the cardiovascular system. It records the transient motion of the body during cardiac action. This motion is caused by the force resulting from the cardiac propulsive effort. The volume and shape of this force constitute the ballistocardiogram. We studied the records of displacement, velocity, and acceleration. Without going into detail, the following observations are worth recording.

Some of the best marathon runners were found to have markedly abnormal ballistocardiograms. Many investigators and clinicians who employ this method of study would consider such tracings to be indicative of organic heart damage. Some of the ballistocardiographic patterns improved following effort, while others deteriorated. Judging from our observations, the ballistocardiogram neither reflects athletic performance nor does an abnormal ballistocardiogram, per se, indicate the presence of organic heart disease. The method, however, deserves further investigation.²

CONCLUSIONS

1. From a clinical point of view, the so-called "athletic heart" appears to be a mere myth.
2. There are wide variations in the size of the heart, pulse rates, and blood pressures of athletes.
3. The athlete who is willing to be studied offers an unusual opportunity to evaluate the effects of strenuous physical activity on the cardiovascular system.

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Heart Rate and Blood Pressure Reactions of Men and Women During and After Muscular Exercise

E. BROUHA, M.D., F.A.C.S.M., and M. E. HARRINGTON

Wilmington, Delaware

PHYSIOLGIC reactions to muscular activity are qualitatively similar for both sexes, but little is known about the quantitative difference in physiologic cost for men and women performing a similar task under similar environmental conditions. Experiments were carried out at 72° F. dry bulb and 60° F. wet bulb, relative humidity 50 per cent.

Blood pressure was measured according to a technic previously described,¹ which uses a conventional blood pressure cuff and an electrical sound pickup for detecting the sound in the brachial artery below the cuff. The cuff is inflated and deflated by automatic means every sixty seconds and the sounds are transmitted to an electrical recorder or to an amplifier. The exercise consisted of pedaling a Krogh-type bicycle ergometer at a constant rate of 60 revolutions per minute for ten-minute periods against a known resistance expressed in kilograms per minute. Heart rate was recorded continuously by chest electrodes and a cardi tachometer.

At the end of ten minutes of exercise, the subject stopped and rested for five minutes, during which time the recovery reactions were measured. Then another period of exercise started and the same procedure was repeated several times. Healthy young adults, 4 women and 4 men, were tested at the following work loads: 360, 540, and 720 kilogram-meters per minute. In addition, the men were tested at 900 kilogram-meters per minute (figures 1 and 2).

The results led to the following conclusions:

1. For a light exercise (360 kilogram-meters per minute), the women maintained a lower systolic blood pressure and a lower pulse pressure

than the men. On the other hand, their maximum heart rate was higher than the men. Recovery from exercise was similar in both sexes for blood pressure and heart rate.

2. For a heavier exercise (540 and 720 kilogram-meters per minute), systolic pressure and pulse pressure reached practically the same level for men and women. The maximum heart rate of the women was markedly higher than that of the men. In both sexes, the maximum increase in heart rate with increasing exercise follows a straight line. Blood pressure recovery after exercise was similar for both sexes, but heart rate recovery to the pre-exercise level was slower in the women than in the men.

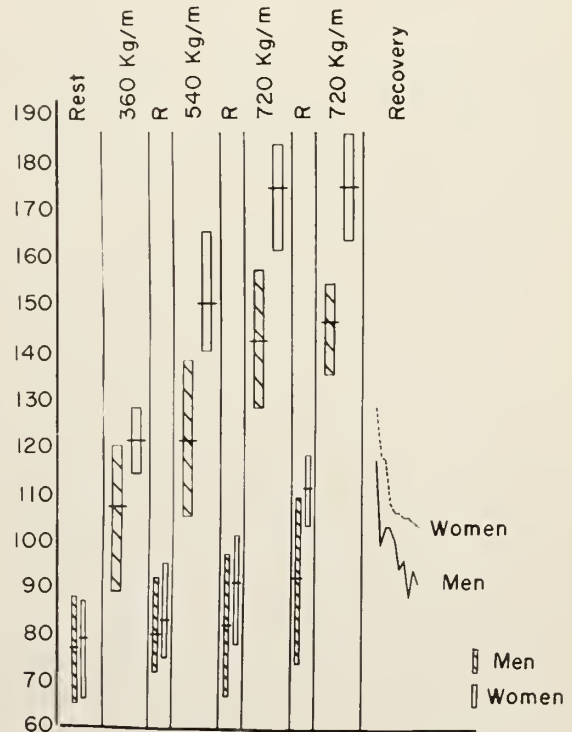


Fig. 1. Means and ranges of heart rates for men and women at rest, working at various work loads and during recovery (abscissa beats per minute).

LUCIEN BROUHA is chief of the physiology section, Haskell Laboratory for Toxicology and Industrial Medicine, E. I. du Pont de Nemours and Company; is honorary professor of the University of Liège; and was consultant of chemical warfare service, United States Army in 1944 and 1945. M. E. HARRINGTON was assistant physiologist at Haskell Laboratory for Toxicology and Industrial Medicine.

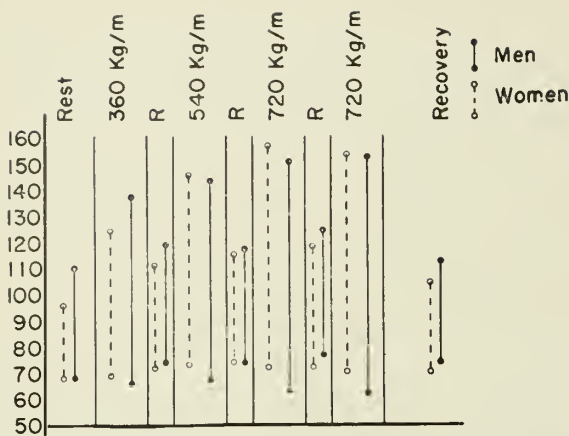


Fig. 2. Average systolic and diastolic blood pressure for men and women at rest, working at various work loads and during recovery (abscissa, mm. Hg).

3. For loads of 540 kilogram-meters or more per minute, it is obvious that among the measurements made in this study, pulse rate is a discriminating factor between sexes during exercise, whereas blood pressure is not.

4. In addition, it was found that in these experiments, body temperature changes were insignificant for both men and women. The total sweat cost measured by weight change from the beginning to the end of exercise was the same for men and women performing the same amount of work. When the men worked at the rate of 900 kilogram-meters per minute, their weight change became greater.

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Succinic Dehydrogenase and Aldolase Activities of Skeletal Muscle of Exercised Rats

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YOUNG ADULT MALE WISTAR RATS with an average beginning weight of 250 gm. were exercised five to eight weeks in a training regimen consisting of swimming for one-half hour daily. Pair-fed, nonswimming animals served as controls.

At the end of the training period, each control animal with its trained partner was sacrificed by decapitation. The gastrocnemius muscle was removed and analyzed for succinic dehydrogenase as described by Wainio and associates,¹ and aldolase activities were determined as described by Sibley and Lehninger.² Statistical comparisons were made in order to follow the trend and magnitude of relationships between the various groups of animals. In treating the data statistically, the technic of critical ratio between correlated means was used. Difference was interpreted as statistically significant at the 5 per cent level confidence.

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All exercised animals gained less body weight than did their controls. The adrenals and heart ventricles of the exercised animals hypertrophied significantly ($P < 0.01$), while the skeletal muscles (gastrocnemii) did not.

Succinic dehydrogenase and aldolase activities were determined in the gastrocnemii. The results were expressed in terms of unit activities, actual total activities, and relative total activities.

The exercise, whether for five, six, seven, or eight weeks did not significantly alter the unit, actual total, or relative total activities of succinic dehydrogenase of the skeletal muscle. However, there were significant increases in both unit and relative total activities of aldolase of the gastrocnemii ($P < 0.02$).

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Postexercise Blood Pressures in Maximum Exertion Tests and Relationships to Performance Time, Oxygen Intake and Oxygen Debt, and Peripheral Resistance

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OUR INTEREST in postexercise blood pressures stems from observing low diastolic blood pressure in Roger Bannister after an "all-out" 40-per-minute step test, 17-in. chair, one minute after the exertion—a drop of 18 mm. Hg from normal quiet sitting values of 114/78 to 170/60. We also saw that Emile Zatopek developed very low diastolic pressure of 210/30 taken one minute after a 5,000 meter race, lowering the diastolic pressure 52.5 mm. Hg. In another instance, his data were reported as 160/40 after fifteen minutes of skipping rope, with the average quiet sitting pressure 133/92.5. Normal quiet blood pressures have been valueless for predicting the time of such hard all-out performances on the step test and treadmill run, but the post-exercise blood pressures have not been adequately studied.

In testing a group of former middle-aged athletes at the Royal Free Medical College in London in 1952, we noticed that even fairly old former athletes, like Harold Whitlock, the great walker and many times world's record holder, could keep his diastolic pressure even with the starting level after an all-out step test, 123/74 to 186/74. Theoretically, we considered this a good result, because men out of condition invariably had a rise in the diastolic blood pressure. Low diastolic pressure was conceived as indicating a fairly low peripheral resistance in the aortic tree, indicating that the ejected blood

must be draining off quite fast due to good circulation through the capillary beds of the muscles and lungs. We decided to investigate this matter further, because it seemed to be an important factor in the endurance of a man in hard continuous exertion and, possibly, even more important in an ordinary individual who wished to use endurance exercise to keep his blood pressures lower than they otherwise would be.

We found that 11 former champion athletes who failed to step as long as two minutes on the all-out step test had an average rise of 1.8 mm. in the diastolic blood pressure, while 4 former champions who stepped considerably longer averaged a drop of -6.5 mm. Hg. Differences were taken from the starting level before stepping and also to the recovery level after fifteen minutes of recovery, with no difference of any importance. This was done to check the point that the starting pressures might have been higher than the postexercise pressures due to emotional disturbance caused by anticipating the all-out effort.

A 58-year-old man in very poor condition developed pressures of 220/128 mm. Hg, leveling off in recovery to 156/106, compared to quiet sitting pressure of 147/100.

In a group of 13 men in an automobile shop, 9 who ran under two minutes on the treadmill at 7 miles per hour averaged postrun diastolic pressures of 88.9 compared to 4 men who ran over two minutes with an average of 79 mm. Hg.

Seventy normal, healthy men aged 17 to 68 years were given an all-out treadmill run. Post-exercise blood pressures were taken just one

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minute after the effort, using an ordinary snap-cuff and mercurial sphygmomanometer. No man lasted over three minutes whose diastolic blood pressure went over 95 mm. Hg after the 7 mile per hour treadmill run, 8.6 per cent grade. The best performance was made by a man whose diastolic blood pressure dropped to 48 mm. Hg (a run of eight minutes). Several good performances fell in the four to six minute class with corresponding blood pressures between 66 and 99 mm. Hg. Also, no good runs were made by men whose systolic blood pressure went over 200 mm. Hg. Some inconsistency with the systolic pressures is known from other data, indicated by a champion like Zatopce forcing his systolic pressure to 220/30.

CHANGES IN PERIPHERAL RESISTANCE
DUE TO TRAINING

Little has been reported on the changes in peripheral resistance due to physical training over a period of several weeks or months. Several examples of this have been verified in our laboratory. I verified 1 case on subject S.L.T., who made appreciable reductions.

	Before	After
S _M Quiet sitting blood pressure (systolic)	180	130 mm.Hg
Quiet sitting blood pressure (diastolic)	130	98 mm.Hg
D _M Quiet sitting mean blood pressure	155	128 mm.Hg
V _S Stroke volume (taken from our chart of amplitude of brachial pulse wave)	25	75 cc./st.
R Rate of heart beat per second	.80	.87 b./sec.
W Peripheral resistance = $P_M/V_S \times R$ (Wezler and Boger, Cf. HENRY, F. M.: Influence of athletic training on resting cardiovascular system. <i>Research Quart.</i> 25:28-41 1954.)	6.69	1.97 mm.Hg per cc./sec.

Following this up, a Ph.D. thesis by Robert E. McAdam of our laboratory, carried out during

1954 and 1955, shows the real possibility of such reduction in peripheral resistance on several other subjects using Grollman V_S with Keys' corrections:

Subject S.L.T., in the second year of such testing, improved 14.1 per cent over five months.

Subject Wah, in the first year of such work, improved 23.2 per cent over five months.

Subject Coc, in the first year of such work, improved 16.4 per cent over five months.

Subject Re, a control in the program four years, improved 3.88 per cent in two months.

Such drops in peripheral resistance were paralleled by reductions in the postexercise diastolic pressure.

CONCLUSIONS

1. Men in top cardiovascular condition for strenuous athletic performance adjust to the stress by developing large pulse pressures, but the post-effort diastolic pressure usually drops rather than rises, indicating quick lowering of the peripheral resistance during the effort. This is quite likely the main constituent of the so-called "second wind."
2. Men in poor cardiovascular condition for strenuous athletic effort do not adjust well to the stress. This lack of adjustment is indicated by relatively high blood pressures after an all-out step test or treadmill run. Such inability to adjust is undoubtedly associated with relatively high peripheral resistance during the stress.
3. Experimental work shows the possibility of reducing the peripheral resistance and the diastolic blood pressures by physical training over several months.

R. E. McAdam and Charles Thomas provided technical assistance for this study.

Role of Athletic Trainers in Prevention Care, and Treatment of Injuries

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THE ATHLETIC TRAINER has a very responsible position in the care of the athlete. This individual must view sports participation with understanding and enthusiasm. He must be loyal to his coach and fair to the player. The trainer must gain the confidence of the boys and be sympathetic to their problems. He must be familiar with the athlete who minimizes injuries and cognizant of a boy who magnifies his ailment. An investigation of the background of an injured player may be more rewarding than hours in the whirlpool.

Athletes who compete in contact sports subject themselves to many types of violence, and close observation will avoid many catastrophes. The obvious injuries can be readily diagnosed and treatment instituted. The more minor injuries can go unattended with no serious consequences. There are, however, several serious injuries that may not produce obvious symptoms, and serious consequences may eventuate. That such injuries may prove fatal is illustrated by an analysis of the deaths in sports in New York City from 1918 to 1950. Twenty deaths were the result of injuries incurred in football. Of these, 10 were caused by various infections; 6 were the result of head and spinal injuries; and 4 deaths were the result of intra-abdominal injuries. In boxing, 20 of the 21 deaths were caused by head injuries. In baseball, 27 of the 43 deaths were due to head injuries; 13 were due to infection; and 3 were the result of intra-abdominal injuries. These are astonishing figures. Yet, deaths in all sports in thirty-two years are far fewer than result from daily accidents.

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The trainer must realize that a physician cannot diagnose some of these problems, even with all the hospital facilities, without adequate observation. How then can the trainer be expected to make such vital decisions on the spur of the moment? He should not hesitate to seek medical aid in complex problems, especially those involving head trauma and intra-abdominal injuries. An athlete who is confused, has unequal pupils, or is nauseated as the result of a head injury must be removed from the game regardless of his protest. After any injury, the player should be closely observed during subsequent play for any danger signs. One must be cautious about moving an injured player until the character of the injury is ascertained. Turning a prostrate athlete and proceeding with artificial respiration can sever the cord if the spine should be dislocated. In such a case, permanent paralysis would result. A Thomas splint should be readily available for transporting an athlete with a fractured extremity. A collapsible litter should be in readiness at all times to carry an injured player from the field.

The proper approach to injuries is prevention! All players must be given a thorough examination by a physician and their physical fitness evaluated for participation in a given sport. Proper equipment must be available and its use supervised.

The greatest aid in prevention of injuries lies in physical fitness. Minor injury and fatigue must be carefully considered, for these factors may affect the coordination and speed of the athlete and make him more susceptible to injury. Well-developed musculature is in itself a protection against injuries. Conditioning is facilitated by adequate nutrition, which is best supervised at a training table. The calorie intake must be sufficient for the energy output and the maintenance of the athlete's best playing weight. Each player differs in the exact quantity of food required. Since the body weight is a measure of the adequacy of the diet, regular and supervised

weighing of the players must be stressed. The diet must consist of adequate protein, fresh fruits, and vegetables. Concentrated sweets, rich desserts, and fats must be used sparingly, particularly by players with weight problems. A variety in the diet is good for the morale. Milk is a good source of the necessary minerals in the diet, but supplementary vitamins are not necessary. The high school athlete needs more protein than an adult. Since energy is required to digest food, it is better to enter a game with a fairly empty stomach. Reasonable amounts of easily digested but satisfying foods should be given five to six hours before game time.

Strenuous activity on a hot day will cause a big football player to lose up to 16 lb. in weight in a single scrimmage. This loss is through sweat and results in a depletion of salt as well as water. If only water is replaced, a salt deficiency results and heat cramps follow. This deficiency can be supplied by salting food adequately and by offering enteric coated salt tablets.

The type of injury varies with the sport. Recently, we investigated football injuries. The most common injury, and our greatest concern, involves the knee joint. Years ago, the ankle was more frequently injured, but, since ankle taping has been instituted, this joint is not frequently hurt. Every player's ankles are strapped before competing. This protects the ankle, but the knee receives the entire impact of the blow. However, the knee cannot be adequately protected without restricting motion, regardless of the brace.

It has been observed that once a knee is injured, it is subject to recurrences in practically all cases. A good share of our bad knees were injured previously in high school football. The disability after a knee injury results in a weakness of the quadriceps muscle group. By favoring his knee, the player loses the conditioning he has developed in this muscle group. The power of this muscle, which is the greatest protection to the knee, when lost, allows any blow to the knee to be taken by the knee ligaments. The knee then is more easily injured, causing greater disability and resulting in increased quadriceps atrophy. We have seen a 2-in. difference in circumferential measurement between the two thighs in a recurrent knee injury.

A case in point is that of a player who injured his knee several times throughout the season. He continued to play football and to maintain the tone in the quadriceps muscle. On examination at the conclusion of the season, this player had a perfectly stable knee joint. An arthrotomy was done and, in addition to a torn lateral semilunar cartilage, there was a torn anterior cruciate

and a partial tear of the medial collateral ligaments. The stability of this knee was maintained by the well-developed quadriceps muscle.

Recently we instituted quadriceps exercises for all knee injuries. The power in these knees is gradually increased until the players are able to extend the knee against a resistance of 100 lb.

All soft tissue injuries should be encased in a pressure dressing with adequate padding. All tape should be removed from the skin and an Acc Bandage applied. This dressing will stop bleeding and reduce swelling. Ice packs for several hours after an injury to a joint greatly reduce the disability. Measures to facilitate the absorption of exudate are begun after twelve hours. Physical agents, such as whirlpool baths, heat, and massage, improve circulation and reduce swelling. Exercise helps absorption of exudate and prevents adhesions.

Ankle injuries are common but usually not severe. All but the minor injuries should be x-rayed, and active exercise and weight bearing must be started immediately. This reduces disability and permits the player to return to competition. The athlete must be instructed to walk normally, since limping causes undue strain on various muscle groups and increases disability.

Wrist injuries are infrequently encountered in athletics. The Colles' fracture so frequently seen in elderly women is not encountered. The strong forearm muscles of the athlete protect the radius, and the impact is carried into the wrist where the small scaphoid bone is injured. This type of injury appears to be only a sprain but, if unrecognized, produces prolonged disability unless given adequate early treatment. All wrist injuries, therefore, should be x-rayed.

Shoulder injuries are common in football. The shoulder separation may cause considerable disability. This injury can be determined, since traction to the arm while hanging at the side increases pain. A dislocated shoulder should not be reduced without a roentgenogram unless it is a chronic recurrence.

An injury to the left flank should be treated seriously, particularly when the lower ribs are fractured. This may injure the spleen, causing a severe intra-abdominal hemorrhage which would require surgery. Similarly, the kidney may be injured and blood passed in the urine.

The trainer, then, is faced with constant problems of potentially serious injuries, which require decisions. His judgment is often influenced by his own desire to win, and his moral obligation to the player. He must be the father confessor, a good psychologist, capable of good judgment, and interested in all phases of the athlete.

Remarks to the American College of Sports Medicine Atlantic City, June 5, 1955

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MAY I OPEN MY REMARKS by stating that there is to my knowledge little factual material available on "contact sports." Fans, parents, coaches, trainers, doctors (if you please), and participants all make statements which I fear are based on impressions and personal experiences. There is nothing wrong with this — impressions develop a challenge which leads to study and research which bring to light the true causes and effects of contact sports.

Over the years I, too, have gained impressions. I would like to tell you a few, and then I would like to give you a few facts and figures compiled by the American Football Coaches Association which, for over twenty years, has sponsored a statistical and scientific study of football.

1. Soccer, basketball, and wrestling enjoy national participation at present without injuries or fatalities of concern.

2. Amateur boxing has national participation at the club level. Few high schools and colleges sponsor competitive boxing programs. The use of heavy gloves and a protective headgear is now accepted. Many colleges and universities, like my University of Pennsylvania, have dropped intercollegiate boxing. We had a fatal boxing injury back in the 1930's. A study revealed a great variance of experience among college boxers. A boy might be the top heavyweight boxer at Penn and have only boxed for a year or two and be matched against the heavyweight boxing champion at a rival college, who quite possibly might have been a Golden Glove champion with several years' experience before entering college. An injury from such a match cannot be justified in my opinion — so, I agree wholeheartedly with my institution's decision to drop competitive intercollegiate boxing.

On the other hand, a sport like wrestling can well have the same widespread variance in ex-

perience, but — the inexperienced boy gets his shoulders pinned to the mat and doesn't suffer the potential serious injury of the boxer.

3. Water polo has been dropped at several colleges because of ear and nose effects.

4. Lacrosse, not as yet nationally functioning on a large scale, does have a large number of minor injuries among those who participate.

5. That brings us to football, the sport with which I am most familiar. May I say before I speak of football that at Pennsylvania we have a large number of minor injuries in *touch football*, supposedly a "noncontact" sport. These occur primarily, I believe, because the college men playing on fraternity or dormitory teams have often had the experience of playing on their high school "tackle football" teams. The players bring their zest, drive, and determination to play well and win into touch football. Only, in touch football, they don't have the protective equipment, and the game in most cases is not properly supervised in team play. Thus, there are a large number of minor injuries.

Tackle football enjoys national participation by schools, colleges, sandlot teams, and professional groups. The large number participating obviously increases the total potential of injury. The National Safety Council statistics in 1954 show that football, a hazardous sport, is comparatively safe. Based on per 100,000 of population between the ages of 15 to 24, the fatal accidents in motor vehicles were 2,772, drowning 357, hunting (firearms) 259, and 17 in football. Naturally, we want to eliminate the 17, and I will tell you what the American Football Coaches Association is doing about it.

Twenty-four years ago as a result of a large number of football fatalities, the American Football Association formed a committee on Injuries and Fatalities. The committee chairman, Dr. Floyd R. Eastwood, serves with a group of coaches, and recently a physicians' advisory

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council has been established on a national basis to advise on matters related to the diagnosis, treatment, and prognosis of injuries. The Coaches Association has financed the annual studies and surveys. We have had the cooperation of the Associated and United Press, a national clipping agency which allows a questionnaire follow-up with educational and medical authorities, and we have enjoyed the help and cooperation of high school and college athletic directors throughout the country. During the football season of 1954, there were a total of 19 fatalities, which is 6.7 increase over the average.

Sandlot	3
Professional	2
High school	12
College	2
	19

Our studies show a football player is most prone to injury during the first five minutes of entering a game. Hence, the need for re-emphasis on adequate warm-up before entering a game.

We know that halfbacks suffer more injuries than other players. The guard position is the safest. We know that about 72 per cent of fatal injuries are caused by traumatic blows on the head. We view with alarm the increase in deaths from heart failure. Over the past twenty-three years, infection has accounted for the largest number of indirect fatalities (459).

With these facts in mind, the Coaches Association is aggressively examining and advising on (1) coaching and officiating technics, (2) the rules of the game and their interpretation, and (3) types and construction of equipment. I might add that for many years we have been conscious of head injuries and have contributed financially and wherever possible technically to the research and development of an efficient helmet that would not only be used in football but also in industry and aviation. A nonprofit corporation, Impact Research Institute, is now in operation, and I'm sure that in the near future it will perfect a headgear and eliminate head injury fatalities.

The Coaches Association has accepted the recommendations of its Injury and Fatality Committee which shows:

1. Every boy playing football must have a complete physical examination before competing and during mid-season.

2. No boy with history of heart abnormalities shall be allowed to play.

3. Every concussion must be x-rayed immediately.

4. A player shall be barred from further football participation if he has suffered a serious concussion.

5. A physician must be on the bench at a football game.

6. Continued and increased emphasis shall be placed on tackling and blocking practice throughout the season.

Contact sports, in the main, are difficult to compare over the years. The argument arises over Dempsey versus Joe Louis, or which was our best football team at Pennsylvania? The undefeated teams of early 1900's — the 1925 team or 1947 team or, perhaps, the 1940 or 1950 teams that lost a game or two? All of these are comparisons of individual versus individual or team versus team, and we don't at present have an accurate measuring stick. On the other hand, in the mile run, the pole vault, the hundred yards in swimming, and so forth, we have a stop watch and tape measure and can accurately compare past and present performances. We can appraise and compare training methods and results.

Four-minute miles, 60-ft. shot puts, and 15-ft. pole vaults have been achieved. We know that if faster times and longer throws and higher jumps are to be our objectives — then, along with innate ability, an athlete must start younger and work longer and harder. To me, this should be of real concern to the American College of Sports Medicine.

Finally, the American College of Sports Medicine must answer the question: are contact sports worthwhile? Do they play a part in American intercollegiate sports?

I am firmly convinced that contact sports are an essential part of collegiate life, and I am convinced also that there are many educational values in a well-rounded sports program.

I believe the most important quality gained from sports — and not generally so recognized — is the opportunity to apply tolerance, loyalty, sportsmanship, democracy, poise, and an understanding, appreciation, and respect for the other fellow.

These objectives cannot be taught because they are *not* subject matter. They are *attitudes* — qualities the world needs today. So, contact sports, under proper supervision rightfully are a part of the American educational program.

Today many sane and thoughtful leaders like those of the American College of Sports Medicine have come to the front. The future is most promising. We must all continue to study contact sports and draft regulations which will keep all sports in their proper place and with proper emphasis on our American way of life.

Warming-up and Physical Performance

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THERE ARE TWO TYPES of warming-up: formal¹ and general. The formal type consists of movements which are employed in the actual contest. For instance, a javelin thrower practices throwing a javelin, a billiard player shoots balls, a jumper jumps, and so forth, each practicing his special skill.

The purpose of a general type of warming-up is to induce general physiologic changes, actually warm up muscles, speed up circulation, increase the ability to assimilate oxygen, and "limber up" the muscles. All this is supposedly achieved either *actively*, by exercising muscles using movements not necessarily of the same type and intensity as those used in the actual contest, or *passively*, through the use of the various sources of heat or by massage.

While no one seems to doubt the usefulness of a formal warming-up, the beneficial effect of a general warming-up is now being critically appraised.

Reports favorable to warming-up. The earliest published report dealing with warming-up seems to be that of Simonson and associates in 1936.² These investigators showed that preliminary exercise improved running time of 100 meters for men and women.

Asmussen and Bøje reported in 1945³ that, with the exception of massage, all other types of warming-up, such as preliminary exercise, short-wave diathermy, and hot showers, are beneficial for sprint and endurance-type rides on a bicycle ergometer. In 1947, Schmid⁴ found that all types of warming-up used by Asmussen and Bøje, including massage, were beneficial for swimming 50 meters, running 100 meters, and riding a bicycle ergometer. In 1954, Malarecki⁵ reported that preliminary warming-up exercise increased riding time on a bicycle ergometer from 4.5 to 70 per cent. Mere thinking of warming-up exercise increased the speed of running

60 meters. In 1956, Carlile⁶ reported that an eight-minute hot shower increased the speed of swimming 40 and 220 yards.

Reports unfavorable to warming-up. In 1949, Hale,^{7,8} under the writer's direction, investigated the effect of preliminary exercise, deep massage, and light digital massage upon the time of running 440 yards and the sprint-type ride on a bicycle ergometer. He found that preliminary warming-up had no beneficial effect on performance. Moreover, he could not find any psychologic effect of warming-up manipulations upon performance. In 1955, Hipple⁹ reported that preliminary racing 50 yards had no beneficial effect upon the two 50-yard races that followed at five-minute intervals.

A definite deleterious effect of warming-up was described by Karpovich and Pestrecov¹⁰ in 1941. Because this observation has been seemingly forgotten, a few details will be given here. At that time, we had a group of excellently trained subjects who practiced bicycle ergometer riding five days a week for several months. They could ride those bicycles with a load of 6 to 7 lb. at 60 pedal revolutions per minute for several hours. They were inmates of a county jail and had plenty of time. If, however, they were given a warming-up exercise consisting of riding an ergometer at the same rate of speed but *without a load* for fifteen to twenty minutes, their performance would strikingly deteriorate. After riding with the usual load for as little as ten to thirty minutes, they would stop, exhibiting signs of extreme fatigue and insisting that the load had been doubled.

We found that by convincing the subjects that the load was the same and by encouraging them to keep on riding, it was possible to get over a critical point at which subjects seemed to be unable to continue. This point was rather constant for each individual. For some men, it was ten minutes; for others, up to thirty minutes. Even after overcoming the critical point, the subjects' endurance on that day was much less than usual — 30 to 50 per cent less.

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Presented at the annual meeting of the American College of Sports Medicine, Chicago, March 24, 1956.

Muscle temperature and intensity of work. It is a fact of common knowledge that body temperature increases during muscular work. The source of this increase is, of course, the extra heat produced by the muscles. Nielsen, in 1938,¹¹ suggested that the rise in body temperature is beneficial to work output. Asmussen and Bøje³ presented graphic evidence showing that there was a direct relationship between the temperature of the vastus lateralis and the speed reached on a bicycle ergometer. The effect was the same whether warming-up was active or passive.

Oxygen consumption. Any textbook on the physiology of exercise contains material showing that the maximum intake of oxygen is reached only after a certain period of work, and, therefore, warming-up should be considered beneficial. It is also an elementary fact that the initial stage of endurance type of physical work is more expensive in terms of oxygen than successive stages. Warming-up, therefore, should make exertion more economical. An exception is an intensive active warming-up, which leaves the subject with a large oxygen debt at the start of the contest.

Staircase phenomenon. An opinion has been expressed that warming-up is beneficial because it increases the contractility of muscle fibers through a staircase phenomenon.¹² Even if the muscles were "fresh or rested," only a fraction of a second would be required to reach the top of the staircase and no elaborate prolonged warming-up is necessary.

Blood circulation. Frequently, coaches and athletes ascribe the beneficial effects of warming-up to an increased circulation. Asmussen and

Bøje³ found no such relationship. They found that a preliminary warming-up on a bicycle ergometer caused no improvement in performance of the arms.

Psychologic effects. Although Hale^{7,8} found no psychologic effect of digital massage, it does not eliminate a possibility of either harmful or beneficial effects of some factors coincidental with warming-up. The harmful effect of underloading has been demonstrated by Karpovich and Pestrecov.¹⁰

Athletes are afraid that without warming-up they may injure their muscles. For this reason, subjects are difficult to find for warming-up experiments during the season of competition. Sometimes, after finding the subjects, results must be discarded because of a subsequent discovery that some subjects were afraid to cooperate fully without warming-up. The psychologic effect reported by Malarecki, however, needs verification.

COMMENTS AND CONCLUSIONS

The effect of warming-up on physical performance of short duration is like the story of a bumblebee in reverse. According to airplane designers, a bumblebee cannot fly — yet, this bee does fly. According to physiology, an athlete should sprint faster after warming-up. Yet, he does not, at least not always. It is obvious that more experimentation is needed. In this connection, it is advisable to use automatic timing devices and to use a "placebo" type of warming-up. For this reason, an experimenter can hardly be his own subject. It is also obvious that not only sprints but also endurance activities should be investigated.

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Ballistocardiographic Study of Marathon Runners

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THIS PAPER deals with one phase of a complete medical study on marathon runners conducted by a group of doctors under the direction of Dr. Joseph B. Wolfe of the Valley Forge Heart Institute, Fairview Village, Pennsylvania. The distance was 26 miles and 385 yards and took place on May 1, 1955, at Fairmount Park, Philadelphia. The race was run under Amateur Athletic Union rules with 105 entries between the ages of 19 to 67 years. The medical study which was very complete included, in addition to history and physical examination, chest roentgenograms, electrocardiograms, oscillometric readings, blood chemistry, and ballistocardiograms, all before and after the race.

A few words concerning the basic principle of ballistocardiography seems apropos before dealing with our findings. If we examine the word ballistocardiograph, we find two parts readily recognizable—"cardio" meaning heart and "graph" meaning recording or tracing. The word ballisto is derived from the Greek word "ballo" meaning to throw. We all recognize "ballistics," which is the science that deals with projectiles. Now what do throwing and projectiles have to do with the heart? If we visualize a person lying in the supine position on a rigid table and ask him to stop breathing, we would casually state that his body is not moving. However, his heart is continuing to beat rhythmically. Newton's second law of motion states "that to every action there is an opposite and equal reaction." Therefore, the body is moving as a result of the recoil of the heart action. Delicate instruments have been devised to measure accurately this movement which is in the order of 20μ or the equivalent of the diameter of three red blood cells.

The fact that the heart action produces recoil waves has been known since 1875, when a physician noted the indicator on a spring scale move

synchronously with his pulse beat. However, modern ballistocardiography started with a surge of enthusiasm as a result of a study by Dr. Isaac Starr started in 1938 and published in 1948. Dr. Starr, a physiologist, was attempting to measure cardiac output by means of the ballistocardiogram. For this study, he wanted normals. The subjects were examined carefully by a competent cardiologist. This examination included a complete physical and history, fluoroscopic examination, electrocardiogram, and roentgenograms. A certain number of these "apparent normals" had ballistocardiograms that were unusual and unlike the average. Ten years later, Dr. Starr investigated these cases and discovered that of those that had abnormal tracings, approximately 50 per cent developed obvious heart disease, whereas those with normal tracings remained free of heart disease. Apparently, the ballistocardiogram was able to pick out those with "potential" heart disease.

If we return once more to the subject on a rigid table, we find that by strapping a light bar across the shins, the motion of the body as it moves on its fat pads can be measured. There are three components of motion that we can measure: (1) displacement or distance, (2) velocity or speed, and (3) acceleration or change in velocity. Since acceleration is directly proportional to force, this measurement has been found to give us the most accurate recordings. The duration of time of action of the driving force is a factor in both displacement and velocity. A relatively weak force acting for a long time will produce a large displacement or velocity and, hence, lead to the false impression of a large force. The Arbeit Ballistocardiogram used in this study measures all three components of motion electronically merely by turning a dial on the instrument.

In our study, we took over 120 ballistocardiograms in all. However, there were only 41 runners on whom tracings were obtained both before and after the race. We shall now analyze our results on these 41. The classification used is as follows:

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- Grade I > 80 per cent repetitive
- Grade II > 50 per cent repetitive
- Grade III < 50 per cent repetitive
- Grade IV chaotic
 - Class a — perfect form
 - Class b — slurring and notching
 - Class c — loss of specificity
 - Class d — chaotic

We used only the acceleration curves to derive our statistics, although displacement and velocity traces were also recorded on each runner. I-a or b were considered normal, since we have found no definite cause for notching and slurring which makes a trace grade b. As one would expect, most tracings were normal. There were 32 normals and 9 abnormals before and 31 normals and 10 abnormals after the race. However, we also noted that 14 became worse, 22 stayed the same, and 5 improved after the race. The majority of those who became worse changed from group I-a to I-b, so that they still remained in the normal grouping.

We would like to present a few tracings in detail, since they are of interest.

In the case of A.A., we have a runner whose tracing was I-b before and remained I-b after finishing in twenty-fifth place. After the post-race tracing, he sat down to smoke a cigarette. Inquiry revealed that he was the only smoker in the entire group. It seems marathon runners just don't smoke. After he finished his cigarette, a repeat tracing was taken and found to have

degenerated to III-c. After fifteen minutes, it had recovered to I-b. Apparently, one cigarette did more to his heart than 26 miles of running.

The next case is that of R.W., a 67-year-old man who has been running marathons for thirty years. He stated that he runs 10 to 15 miles twice a week to keep in shape. His ballistocardiogram was completely abnormal III-c before the race, and yet he completed the course running all the way and finishing forty-fifth. In last year's race, his ballistocardiogram was also III-c before and after.

To what conclusion can we come as a result of this study? First of all, we noted no pronounced detrimental effect upon the heart as reflected by the ballistocardiogram as a result of running 26 miles. Also, as demonstrated in the last case, the ballistocardiogram would not be a satisfactory screening test for athletes before a strenuous race. Obviously, a man able to run 26 miles must have at least average cardiac reserve, and yet, in this case, the ballistocardiogram was completely abnormal.

The ballistocardiogram as intimated in Dr. Starr's study is a sensitive instrument. Because of this sensitivity, it is a difficult instrument to apply clinically, at least at present. There is much to be learned about ballistocardiography before it can be used safely without danger of causing persons to become cardiac neurotics.

The author wishes to thank Dr. Sidney Arbeit of Jersey City, New Jersey, for his cooperation in this study.

LEADERS IN MEDICINE, physiology and physical education have made commendable progress in studying the effects of various forms of physical exertion on the body. However, there has been no adequate interchange of experience and knowledge. This "professional isolationism" has often resulted in a failure to consider important aspects of the problem and to translate into practical application significant findings by independent investigators in the various related disciplines.

The American College of Sports Medicine was established with the avowed aim of closing these gaps and fusing the experience and know-how of top-flight scientists in all related fields under a united aegis. Among other accomplishments, cooperative efforts should produce an authoritative pharmacopoeia of motor activities — a reliable reference manual to aid in prescribing the type and amount of activity for individuals according to their respective needs and capacities.

Effects of Elementary School Physical Education Upon Some Aspects of Physical, Motor, and Personality Development of Boys 12 Years of Age

H. DOUGLAS WHITTLE, Ph.D., F.A.C.S.M.

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MUCH PUBLISHED EVIDENCE shows the desirable effects of participation in well-organized and rigidly-designed training programs of physical training and conditioning. The results establish a significant increase in muscular strength, endurance, and organic efficiency. On the other hand, a school curriculum program of physical education usually includes a wide variety of activities which may or may not yield the expected outcomes as anticipated. The facts should be known.

Therefore, the primary purpose of this study was to determine the effects of elementary school physical education upon some aspects of physical development, motor fitness, motor educability, body flexibility, muscular explosive power, and the personality of 12-year-old boys. In this process, a contrast was made for the elements studied between boys who had participated in good and poor elementary school physical education programs. Furthermore, the same characteristics were studied for boys in each category who had taken part in both the good and poor physical education programs and who had participated a great deal and a little in physical activities outside of the physical education classes.

In realizing the purposes of this study, two factors were investigated. These factors with their related elements are:

1. Maturity elements: chronologic age, skeletal age, height, weight, and growth level.
2. Affective elements: basic strength, motor

fitness, motor educability, body flexibility, muscular explosive power, and personality.

The maturity factors were selected as elements which would reveal the basic growth and development of boys. It was believed that these elements would not be affected significantly by physical education participation. The affective factors were proposed as elements which logically could be affected by physical education participation. So, it is primarily with these elements that any values of elementary school physical education revealed in this study would be demonstrated.

CONCLUSIONS

The conclusions that appear valid as a result of this study are as follows:

1. In this study, the two groups of 81 boys each, who participated in good and poor elementary school physical education for a period of three years, were found to be essentially alike in the maturity elements of chronologic age, skeletal age, weight, height, Wetzel developmental level, and McCloy's classification index I. However, differences between the 2 groups were definite for the following affective test batteries and affective test items, with *t* ratios for the difference between means given in parentheses for boys aged 12 years and 6 months: leg lift strength (5.65), physical fitness index (5.64), Metheny-Johnson test of motor educability (5.09), strength index (4.97), back lift strength (4.26), Indiana physical fitness test (2.59), vertical jump (2.51), and arm strength (1.94). Similar results were obtained when chronologic age was restricted to 12 years and 2 months.

In view of the basic maturity similarity of the two age groups, it is concluded that the superior performance in the listed affective test items and batteries of the boys from the good programs are

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attributed to their participation in this type of physical education during their elementary school years.

2. The boys from both the good and poor programs who participated a great deal in physical activities outside regular physical education classes demonstrated pronounced superiority to those who did not participate very much in such activities in the following affective measures: physical fitness index, strength index, Metheny-Johnson test of motor educability, Indiana physical fitness test, vertical jump, arm strength, grip strength, leg lift strength, and back lift strength. There were also differences between the outside participation classifications in some of the maturity elements. Especially, the very active participants in the poor programs were older (skeletal), taller, and heavier than those taking little part in poor programs. They were taller and heavier than the boys who participated a great deal in good programs and had a higher classification index than did the boys taking little part in poor and a lot in good programs.

From these results, the conclusion seems justified that boys who participate a lot in extracurricular physical activities are superior in the affective elements listed to those who participate a little in such activities. Conclusions, however, as to whether the participation produces the su-

perior boys or whether these boys participate in outside activities because they are superior, or whether the cause is a combination of both these factors are not possible from this study.

3. In this study, statistically significant differences in the three flexibility measures included were not obtained for boys in the good and poor physical education programs, nor were they found among the boys in the various categories based on extracurricular physical activity participation. Inasmuch as the instrument used in measuring flexibility, the Leighton flexometer, had been well constructed and validated, it must be concluded that these test elements are not significantly affected in general by participation in the physical education and extracurricular physical activities of the subjects.

4. The improvement of social and personal adjustment, as measured by the California test of personality, was not established in this study as a consequence of participation in good physical education programs or in a great deal of extracurricular physical activity. Conclusions on these findings are withheld until such time as other tests and technics for evaluating such adjustment are applied to this problem.

Grateful acknowledgment is extended to Dr. H. Harrison Clarke, research professor at the University of Oregon, under whose guidance this study was completed.

IN ADDITION to sponsoring and encouraging important research in all aspects of fitness, the American College of Sports Medicine is setting up a series of workshops in various parts of the country where advanced studies and effective programs are in progress.

Fellows of the College, as well as others pursuing applied research in medicine, physiology, physical education, and related sciences, are making their facilities available for visits by other colleagues in the American College of Sports Medicine. Fellows are thus afforded valuable opportunities to exchange views with scientists in interrelated fields. By attending such workshops, associate fellows and members can enhance their eligibility for advancement in grade within the College.

Exercise Therapy for the Ill

C. H. McCLOY, Ph.D., F.A.C.S.M.

Iowa City, Iowa

EXERCISE THERAPY is a relatively new field in medicine. It received its greatest stimulus toward development during the second World War when it was used in the hospitals of the armed services in many countries. These programs were called by various names, such as physical reconditioning, physical rehabilitation, and (Veterans' Administration), corrective therapy.

Before the use of exercise therapy programs in medicine, the generally approved procedure was for patients to lie in bed until they were almost ready to return to their homes, or, in the case of the armed services, to return to duty. They were, after a week or ten days, usually permitted to get out of bed and walk around the hospital. This procedure of prolonged bed rest sometimes resulted in the patient's suffering an attack of phlebitis, with sometimes fatal attacks of embolism. In more recent years, two movements have cooperated to avoid this result. One is the movement termed "early ambulation," in which the patient is allowed out of bed on the second or third day after his operation and very soon after his fever has returned to normal (or his sedimentation rate has dropped to normal), and he is encouraged to walk a bit every day. In the other form of exercise therapy, the patient is first exercised in bed and later out of bed, often in some exercise hall connected with the hospital. As a result of this latter program, the patient is usually ready to return to work in about two-thirds the time that it would have taken had he not been given this exercise program. Thus, deconditioning is prevented, and the period required to recuperate his strength after he is discharged from the hospital is lessened. This type of procedure is not only important in the armed forces, but it is extremely important in industrial medicine, as it lessens the number of days that the patient is in the hospital, and returns him to full duty in his industrial job much more quickly. This saves wages for

the worker, and less time is lost for the employer.

In the armed services, the patients were largely young, and usually the disabilities were acute. In private medical practice and in industrial medicine, as well as in veterans' hospitals, there are more and more people of middle and older age and of both sexes, and many of the disabilities are more chronic.

The prescription of exercise must *always* be made by a physician. In many cases, this may be the physician who is treating the patient, or it may be a physiatrist, or specialist in physical medicine, who is cooperating with the patient's physician. The doctor does not usually make out this prescription by writing out each exercise as he might write a prescription for drugs. It is usually a *permissive* prescription. This refers to a book on this type of exercise which is used in the hospital in form of an exercise formulary. A "formulary," as used in teaching hospitals in the United States, is a booklet of formulas of the approved prescriptions of drugs used extensively in that hospital. It presents correct combinations and dosages of drugs, and these are usually kept prepared by the hospital pharmacy. These formulas and prescriptions have been studied and approved by the medical staff of the hospital.

In the recent World War, the writer was in charge of the physical reconditioning of the Department of the Army. The "exercise formulary" prepared for the Army hospitals was written by the writer. These exercise formularies are TM 8-292, physical reconditioning, and TM 8-294, advanced physical reconditioning. Every part of these books was discussed with specialists. For example, exercises for patients with disabilities of the heart were discussed with the cardiologists of the Office of the Surgeon General and with cardiologists in several of the Army's hospitals where a considerable amount of experimentation with the program was done. The part dealing with general medical treatment was discussed with the specialists in internal medicine at the Office of the Surgeon General and in several hospitals. The corrective exercises to be used for individual disabilities, such as an injured

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shoulder, and so forth, were reviewed first with specialists from the department of physical therapy of the Office of the Surgeon General, second by the surgeon in charge of orthopedic surgery at the Surgeon General's Office, and later at several hospitals. Each section of this exercise formulary was prepared in that manner. As a result, physicians who usually were not well acquainted with how to prescribe exercise could with confidence prescribe the exercises given in that formulary.

Objectives. The objectives of exercise therapy are as follows:

a. To prevent deconditioning, by giving exercise in time to maintain the patient's strength.

b. When there has been deconditioning (as would, of course, be true in such illnesses as rheumatic fever and in cases of grave injury), to recondition the patient and bring his strength and endurance back to normal.

c. To strengthen weakened parts after the cessation of definitive treatment, to increase range of motion, and, in general, to help to return to normal function.

1. This type of exercise might be used for weakened hearts, as in the case of rheumatic fever after the disease is under control.

2. It may be used in cases of poliomyelitis and its residual injury. It has also been used in cases of nerve injuries and so forth.

d. In civilian hospitals and in private practice, it is often used for a partial rejuvenation of the aging.

Classification of patients. Patients are usually classified as bed patients, ambulatory patients, early convalescents, and late convalescents. Bed patients are in turn classified under two heads: (1) the patient who cannot be permitted to do any exercise, as in acute fevers, rheumatic fever, and diseases of that type, and (2) the bed patient who can exercise in bed. Deconditioning is always fastest in those who are very ill and in those who are in great pain and who are frequently under opiates.

Modalities utilized. The modalities utilized under the area of physical medicine are physical therapy, occupational therapy, and what I have here termed exercise therapy. In the hospitals of the Veterans' Administration in the United States, this is called corrective therapy. This paper deals only with this latter modality. Of course, each of the others has its distinctive place, and all three work together for the welfare of the patient.

In many cases, particularly with bed patients in private rooms in hospitals, the exercise must be given individually, which is relatively waste-

ful of man hours. Where possible, patients with the same disability and about the same degree of recovery may be put in the same wards and exercised together in groups. Some individual differences may be observed. If certain movements interfere with the healing of a surgical incision, others may be substituted.

General principles. a. The first general principle is that the patient must be exercised to the point where the load on the muscle is in excess of that to which he has been accustomed. He makes no progress if there is not a certain amount of overload. An overload for a very weak patient would, of course, be much less than an overload for the same patient when he is nearing complete recovery.

b. The progression of exercise must be very gradual but continuous. This may consist of a more strenuous day's order of activity or more repetitions of each movement.

c. It must, of course, be determined that no exercise will be used which will injure the patient.

d. The purpose of the exercise is to build up the patient's strength and muscular endurance. For war and sports, cardiorespiratory endurance is also taken into consideration.

e. There will be special exercises of a remedial nature for disabilities of individual parts of the body, such as injured shoulders, injured knees, and chest wounds after operations on the lungs.

In considering the matter of the overload principle, it has been found that exercises utilizing up to about two-thirds of the maximum strength of the muscle are much more useful than those with smaller dosages. To illustrate, the writer can flex his forearm with a dumbbell of approximately 45 lb. in his hand. If I were to strengthen the muscles which flex the forearm and were to exercise with a weight of only 10 lb. in my hand, I might develop some muscular endurance, but the exercise would have almost no effect upon the development of *strength*. This is because the muscle is already much stronger than is necessary to flex the forearm with 10 lb. in the hand. If, on the other hand, I were to first flex the forearm with a weight of about 25 lb. in my hand and do the exercise perhaps 10 or 12 times as a warm-up and were then to perform the exercise as many times as possible with about 35 lb., the muscle would grow in strength quite rapidly, at least as much as about 5 per cent per week. The weight would have to be increased, of course, as the muscles improved in strength.

Recently the work of Hettinger and Müller¹ has indicated that it may be possible to increase

strength at about the rate indicated by simply holding one isometric contraction for six seconds. More work needs to be done on this type of exercise to determine its effect on endurance as well as on strength. It is, however, a type of exercise that can well be used with individuals who cannot with safety engage in other types of exercise. For example, it may be used in the hospital bed when the exercises of each part of the body are separated by ten or fifteen minutes, in cases of coronary occlusion of a minor type, and in many other disabilities of the heart, or sometimes of the nervous system when other forms of exercise might be extremely dangerous.

Exercises in connection with surgical operations. It should be remembered that the surgical patient is practically normal except for the part that has been operated on. For example, an individual whose gallbladder has been removed has normal legs, back, chest, shoulders, arms and neck, but has had certain muscles in his abdomen incised. He can, if the exercises are well chosen, begin exercising the day after surgery if he exercises only the parts that are still normal. He may begin, of course, only when his surgeon so indicates. In general, certain precautions must be taken. First, he should keep his glottis open so that there is no undue intrathoracic or intra-abdominal pressure. This will do a great deal to prevent any sutures from rupturing. Second, he must not do any jumping, so that the condition sometimes called a "water-hammer effect" cannot occur. It will be remembered that the viscera are about 90 per cent water, and hence a viscus, such as the small intestine, which has been repaired, is really "floating" in a "pool" of abdominal viscera that are 90 per cent water. If there is no jarring and no undue straining by closing of the glottis or by too much bending, exercise may be engaged in with safety long before these parts are completely healed. In general, the chest should be kept high and not carried downward in surgical cases of the chest or abdomen.

For some reason, there is a large transfer of exercise effect from the nonoperated parts to the operated parts. For example, a man with a fractured right lower leg whose leg is in a cast will have the muscles of that leg improved somewhat, or at least deconditioned much slower, if other parts of the body are used. I do not know the causes of this transfer-of-exercise effect, but it has repeatedly been demonstrated in my laboratories.

Exercise for the medical patient. Again, the exercise is never begun until it is prescribed by the physician. Usually, it has been found that

exercise can be begun with profit as soon as the sedimentation rate is approximately normal. This is usually about twenty-four to forty-eight hours after the fever has become normal. This, of course, is not true in such disabilities as rheumatic fever. The results of such exercise programs are quite striking. In one experiment conducted in an Air Force hospital near St. Louis during the war, 300 patients with virus pneumonia who were given the exercise treatment were contrasted with 300 who were not exercised. Exercises were begun as soon as the sedimentation rate was approximately normal, and, as stated above, this was usually about twenty-four hours after the fever was normal. These individuals first exercised only about fifteen minutes and very gently. The next day they extended the amount of exercise to about half an hour. Within ten days, the amount of exercise was up to as high as four hours per day, about three hours of it being rather nonstrenuous play.

The exercised groups were in the hospital an average of thirty-one days and the nonexercised groups an average of forty-five days before returning to duty. The exercised patients had a relapse rate of 3 per cent and the nonexercised patients a relapse rate of 30 per cent. This would seem to indicate some of the values of such exercise programs.

The exercise must, of course, be begun gradually and progress made in accordance with the condition of the patient and his ability to tolerate it. In recovered rheumatic fever heart disease cases, the patient is usually exercised at first only while lying down, and progress is very gradual. It is surprising, however, how rapidly he can progress under a well-worked-out program. This exercise program is also used in connection with the principle of getting the patient out of bed and walking around the ward and hospital as early as possible and keeping the amount of exercise within his tolerance.

As stated previously, in many cases, this exercise can be done with groups of patients and need not always be prescribed individually. This has good psychotherapeutic results. The patient works better when he is working with others. This does not mean, of course, that the exercise program is the same for everyone. For example, some individuals may be told to stop on the sixth repetition. Others may be told to stop on the eighth repetition and some not until the sixteenth. Some are told that they may not perform certain exercises, while others may do them.

In cases of nerve injuries or similar conditions, individual corrective exercise is also prescribed.

Some of the best and most valuable forms of

treatment for the neuropsychiatric patient have been published elsewhere.² Since this treatment would be a paper all by itself, it will not be discussed further here.

Types of activities. The types of activities that have been most used in reconditioning programs with which the author has been connected have been those of free-hand exercise or exercise with dumbbells, barbells, springs, and so forth. These may all be used either with bed patients, ambulatory patients, or convalescent patients. Posture exercises are frequently used. Pulley weights, stall bars, and other forms of gymnastic apparatus may be used from time to time. A good deal of hiking and, later, running is used with convalescents. The various types of therapeutic apparatus usually used by physical therapists are, of course, also indicated. The medicine ball is frequently useful, as are informal games and individual sports, such as badminton, tennis, and activities of that type. Swimming and other aquatic programs are of great usefulness where the facilities exist.

The corrective program. With this program, a great deal of work can be done for parts of the body that have been injured, and much may be done without any apparatus. When an apparatus, such as shoulder wheels, and various methods of putting an overload on individual parts of the body are available, as they frequently are in the physical therapy gymnasium, these forms of treatment are also of use. Work therapy may also be used, where the patient is taught to do useful work of a type that will exercise his disabled part.

A few miscellaneous observations may be in order. In Army hospitals, a good deal of emphasis has been placed on training patients to use a prosthesis. This is a special type of reconditioning of its own.

The stretching of fasciae is also important in cases in which movement has been limited. The patient is also frequently taught to relax in order to get more rest.

At the beginning of all knee-bending exercises, particularly for those who are overweight, the heels are kept on the floor. This reduces the

strain on the posterior cruciate ligament, and later as these ligaments strengthen, the individual may do the usual knee-bending with the trunk erect and the heels raised.

It is usually also wise not to do forward bending with weights in the hands to too great an extent. A rather gentle bend will exercise the back without straining the sacroiliac joint. Overweight patients should, of course, reduce.

One could go on discussing the tests to be used. These tests, however, are described in considerable detail in textbooks that are now available.³ Other tests of a circulorespiratory nature (see the same text, sections 490 and 496) may be used to determine when patients may increase the amount of exercise.

CONCLUSION

In conclusion, I would like to say that I believe that this type of program will someday be standard procedure in every civilian and military hospital. It will save perhaps 20 to 50 per cent of the hospital days, and will usually save at least a third of the time between the onset of illness and the time when an individual may return to a full-work program. The cost will be negligible. For example, suppose a patient is in a hospital for ten days with a hospital room cost of \$9.00 per day — and without exercise. He will probably be able to go home at the end of his seventh day if he has been adequately exercised. This would be a saving of \$27.00, and certainly the cost of the exercise therapist would not be nearly that amount when his services are distributed over a large number of patients in the hospital. So, the movement is actually economical. I suggest that organizations interested in sports medicine and hospital practice in general give much attention to the use of exercise formularies of the kind indicated and to extension of this treatment not only to hospital patients, but to convalescent patients who are normally treated at home. They can be taught home exercise programs by a visiting reconditioning specialist to use by themselves and can also, in many cases, go to private gymnasiums for a short course of such exercise during early convalescence.

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Program of the Fourth Annual Meeting of the American College of Sports Medicine

Hotel Barbizon-Plaza, New York City

June 7 and 8, 1957

PROGRAM

Friday, June 7

12:00–2:30 P.M. Luncheon. Business meeting of the board of trustees of A.C.S.M. (closed)

Presiding: JOSEPH B. WOLFFE, M.D., president of A.C.S.M.; medical director of Valley Forge Heart Research Institute, Fairview Village, Pa., and Wolffe Clinic, Philadelphia

Secretary: GROVER W. MUELLER, M.S.Ed., secretary of A.C.S.M.; director, Division of Physical and Health Education, Philadelphia Board of Public Education

2:30–5:00 P.M. Presiding PETER V. KARPOVICH, M.D., chairman of research committee; professor of Physiology, Springfield College, Springfield, Mass.

Exercise in Health and Disease

Panel Discussion: W. E. GORDON, M.D., Michael Reese Hospital, Chicago; EARL F. HOERNER, M.D., clinical director, The Kessler Institute, West Orange, N. J.; and GEORGE READER, M.D., assistant professor of clinical medicine, Cornell University

6:00 P.M. Dinner (by invitation only)
Discussion on Ways and Means to Decide what Objective and Subjective Data Will Help to Determine Physical Fitness

Saturday, June 8

9:00–11:00 A.M. Presiding: ARTHUR H. STEINHAUS, Ph.D., vice president of A.C.S.M.; dean of the College, professor of Physiology, George Williams College, Chicago

Paper: *Succinic Dehydrogenase and Aldolase Activities of Heart Ventricle of Exercised Rats*, GEORGE R. HEARN, Ph.D., assistant professor, Department of Physiology and Biochemistry and the Bureau of Biological Research, Rutgers University, New Brunswick, N. J.

Paper: *Cardiovascular Accident, Grand Mal and Petit Mal as Possible Causes of Drowning*, JOSEPH B. WOLFFE, M.D., president of A.C.S.M.; medical director, Valley Forge Heart Research Institute, Fairview Village, Pa., and Wolffe Clinic, Philadelphia

Discussion of papers

11:00–11:15 A.M. Recess

- 11:15–12:30 P.M. Presiding: JOSEPHINE L. RATHBONE, Ph.D., associate professor, Department of Health Education and Physical Education, Columbia University
- Paper: *Muscle Tone*, EDMUND JACOBSON, M.D., Chicago
- Paper: *Restoration of Maximum Function Following Soft Tissue Injuries of the Knee*, ROBERT L. PRESTON, M.D., New York City
- Discussion of papers
- 12:30–2:30 P.M. Luncheon. No formal arrangements
- 2:30–5:00 P.M. Presiding: ALBERT S. HYMAN, M.D., vice-president of A.C.S.M.; clinical professor of medicine, New York Medical College, New York City
- Paper: *What Happens to Marathon Runners*, BURGESS GORDON, M.D., president of the Woman's Medical College of Pennsylvania, Philadelphia
- Paper: *Humanism, Athletics and the Superhuman*, ALLAN J. RYAN, M.D., Meriden, Conn.
- Paper: *The Cardiologist Studies Golf*, ROBERT E. LESLIE, M.D., cardiologist, El Camp, Texas
- Discussion of Papers
- 6:30–7:30 P.M. Cocktails
- 7:30 P.M. Dinner. Speaker: DR. SHANE MACCARTHY, executive director, President's Council on Youth Fitness
- Chairman of Program Committee: LOUIS F. BISHOP, M.D., assistant clinical professor of medicine, New York University
- Chairman of Committee for Arrangements: RAYMOND A. WEISS, M.D., associate professor of Education, School of Education, New York University

Ependymoma of the Right Occipital Lobe with Death from Extracranial Metastases

PAUL J. BRESLICH, M.D.

Minot, North Dakota

METASTASIS FROM GLIOMAS to tissues other than those within the cerebrospinal spaces has been regarded as rare. R. A. Willis,¹ in his discussion of remote secondary growths, maintains that metastasis by the blood stream probably never takes place from gliomas. Kernohan and Sayre² write that an unexplained peculiarity of primary central nervous system tumors is the extreme rarity of metastasis outside the central nervous system even in tumors derived from nonspecific tissues. The only example of such an occurrence in their reports was a hemangioblastoma of the frontal lobe which ultimately metastasized to the lungs.

In contrast, metastatic tumors are frequently found in the brain. Cancers originating in the gastrointestinal tract, breasts, kidneys, and particularly the lungs are not an unusual source of cerebral metastases. Such primary foci, when small, may be easily missed in the routine post-mortem examination. This has caused many authors to regard with suspicion all reports in the literature in which brain tumors were considered to be the source of secondary growths outside the central nervous system. Undoubtedly some were cases in which small unrecognized tumors, primary in the lungs or elsewhere, had metastasized to the brain and other tissues.

Many of the earlier papers were incomplete in that postmortem examinations were either not carried out or not mentioned, and often the histologic descriptions were inadequate. Microphotographs, especially in the older reports, were poorly reproduced and did not lend themselves to further study when they were subsequently reviewed by other authors. Abbott and Love³ in 1943 were led to classify previous reports of intracranial neoplasms with extracranial metastases into three groups: (1) cases which they did not believe were primary tumors of the brain or in which they were not sure that the metastatic tumors, if such they were, came from the brain tumor; (2) cases in which metastasis

was questionable but could possibly have arisen from tumors of the brain; and (3) cases in which metastasis was probable but not entirely certain. They reviewed 16 cases of various primary intracranial tumors which were reported as metastasizing outside the central nervous system and its envelopes. The neoplasms were not only gliomas, but also melanomas and tumors of meningeal, arachnoidal and vascular origin. Six were not accepted as metastasizing intracranial tumors and placed in group 1. Seven were accepted as possible cases but were open to question and listed in group 2. Three cases belonged in group 3 and to this group they added a fourth. Other authors have since adopted a similar classification in their reviews of the pertinent literature.

In the reports immediately available in the English literature, the following 7 cases of glioma with distant metastases were reviewed. Not all of them are accepted without question by other authors, particularly the cases of Davis, Nelson, Cross and Cooper, and Maass.

1. In 1928, Davis⁴ reported an instance of spongioblastoma multiforme of the left temporal lobe with metastases in the right arm, left lung, and the soft tissues over the right scapula and left costal margin.

2. In 1936, Nelson⁵ reported a medulloblastoma of the cerebellum with metastases in 4 of the lower thoracic vertebral bodies.

3. In 1951, James and Pagel⁶ described a case of oligodendroglioma involving the parieto-occipital region of the right cerebral hemisphere, which later recurred and involved the scalp and metastasized in the lymph nodes about the right ear and in the upper cervical glands and finally spread to the lungs, pleura, hilar lymph nodes, and right femur.

4. In 1952, Cross and Cooper⁷ reported an undifferentiated glioma arising in the left frontoparietal lobe with small metastases in the abdominal wall and lungs.

5. In 1954, Maass⁸ recorded an instance of ependymoma of the left occipital lobe with metastases in the cervical lymph nodes on both sides. The diagnosis was confirmed by biopsy

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of a node on the right, but no autopsy was performed.

6. In 1955, Leo Weiss⁹ described an ependymoma of the cauda equina which recurred after operation and extended to the vertebrae, retroperitoneal tissues of the pelvis and abdomen, spinal musculature, common iliac veins, inferior vena cava, liver, lungs, hilar lymph nodes, mediastinal soft tissues, and chest wall.

7. Finally, Sherbaniuk and Shnitka,¹⁰ in 1956, reported an ependymoma involving the left parietal region of the brain with metastases in the lungs. There were also secondary growths in the scalp.

Almost all of these patients died because of disease in the brain and, in one instance, in the spinal cord. The metastases were often incidental findings at postmortem examination. In the case reported by James and Pagel, extensive pulmonary metastases with bilateral pleural effusion and increasing dyspnea were probably the immediate factors in the final fatal outcome.

In reading the reports of intracranial tumors, whether gliomas or tumors arising in the meninges or blood vessels, one is impressed with the fact that many of these patients survived for years after the onset of symptoms, and most of them had been subjected to multiple surgical procedures on the primary tumor or its recurrences. For example, the patient described by Sherbaniuk and Shnitka lived thirteen years and had 3 operations, and the patient Weiss discussed lived for ten years and had 4 operations. Surgical procedures which divide the coverings of the central nervous system and open the blood channels permit the tumor to invade the surrounding bone and soft tissues, such as the scalp. Masses of tumor cells may also be expressed into the open cerebral veins and larger cranial venous sinuses. That invasion of the surrounding bone and extension into the regional veins may occur is strikingly illustrated in the case Weiss describes in which an ependymoma of the cauda equina infiltrated the vertebrae, extended into the inferior vena cava and common iliac veins, and eventually metastasized to the lungs and other tissues. The long period of survival makes it possible for the cells from these slowly invading neoplasms to be transported through the lymph channels to the regional lymph nodes or by way of the veins to the lungs and finally to more distant places. Sherbaniuk and Shnitka suggest that the long interval between operation and the appearance of metastatic tumor is consistent with the latent period sometimes observed with other tumors and represents a time during which the glioma cells may adjust them-

selves to an extracerebral environment. They also express the opinion that improvements in anesthetic, surgical, and therapeutic technics by prolonging survival will increase the incidence of recognized metastatic lesions in glioma.

An instance of ependymoma primary in the right occipital pole of the brain with massive metastases in the lungs and hilar and tracheobronchial lymph nodes was recently observed at Trinity Hospital in Minot. The case illustrates the features just enumerated. The patient survived two years after onset of symptoms, during which time he was subjected to 2 craniotomies. Aside from its rarity, the case is interesting because death was caused by metastatic disease of the lungs in a patient who had almost no complaints referable to the brain during his last illness in the hospital.

CASE REPORT

A 13-year-old boy was admitted to the hospital on August 30, 1956, and died September 17, 1956. According to his parents, he first became ill in September of 1954 with headaches and vomiting. He was brought to Dr. J. G. Barrie of Estevan, Saskatchewan, who found evidence of an intracranial tumor and referred him to the Mayo Clinic for further investigation and treatment. According to a letter from his surgeon, Dr. Collin S. MacCarty, he was operated upon September 25, 1954, and a large, semien capsulated, partially cystic tumor was removed from the occipital portion of the right cerebral hemisphere. Histologic examination disclosed a grade III ependymoma (figure 1). He was given roentgen therapy and remained quite well until March of 1956 when headaches, nausea, and vomiting again appeared. Visual field examination disclosed a left homonymous hemianopsia and bilateral papilledema. At the second

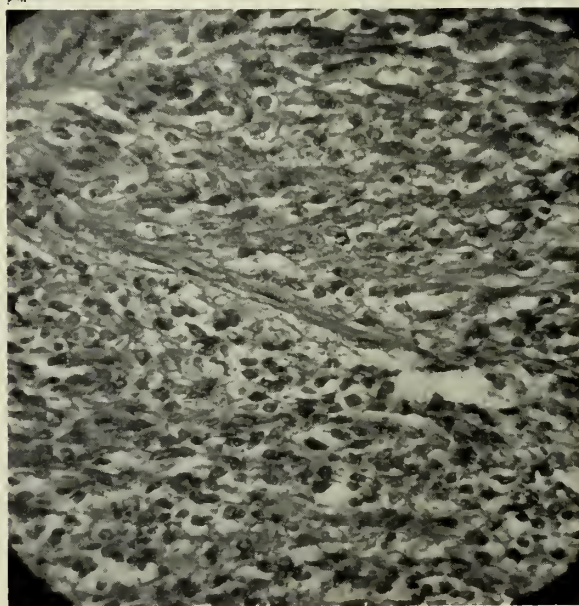


Fig. 1. Ependymoma from right occipital lobe removed at first operation, September 25, 1954.

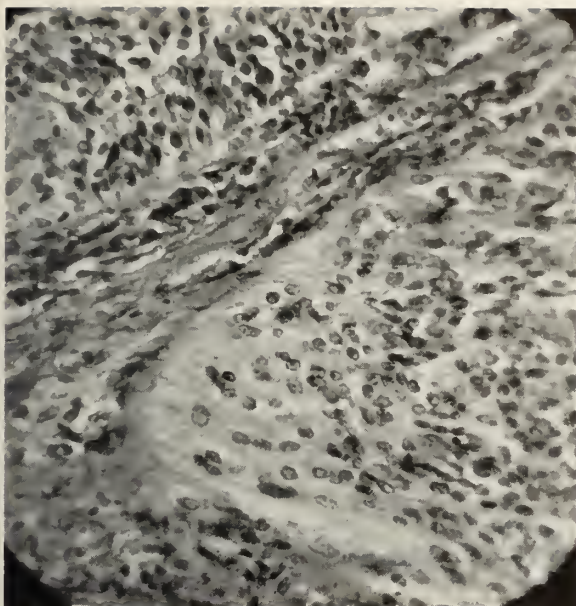


Fig. 2. Tissue from ependymoma removed at second operation, April 5, 1956.

operation, performed by Dr. MacCarty on April 5, 1956, a recurrent tumor was removed from the right occipital region which also proved to be a grade III ependymoma (figure 2). The involved regions were again treated by irradiation. In June of 1956, he complained of cough and later of pain in the right chest. In July, he was brought to Dr. Barrie, who found fluid in the right chest and evidence that the lungs were now involved by tumor. His condition became worse, and he was sent to Trinity Hospital for terminal care. No mention was made of lung disease when he was studied before his second operation, but roentgen examination of the chest in the Mayo Clinic on April 7, 1956, showed changes in the right base which were interpreted as a pneumonitis.

Examination on August 30, 1956, disclosed a well-healed surgical scar in the right parieto-occipital region. The scalp was devoid of hair except for a large tuft in the frontal region, another in the posterior parietal region, and still another in the lower occipital region. There was pronounced dyspnea and cyanosis, and the child complained of severe pain in the right side of the chest which made breathing difficult. Resonance and breath sounds were normal on the left, but the right side of the chest was flat to percussion upward to the level of the angle of the scapula, and breath sounds were only faintly heard. The neurologic examination disclosed no gross abnormalities of the cranial nerves or peripheral tendon reflexes. The plantar reflexes were normal. Visual field studies were not attempted because of the severe respiratory distress which made any examination requiring the close attention of the patient impossible. Roentgen examination of the chest showed pronounced thickening of the pleura on the right side. Densities were observed in both lungs. They were more extensive on the right and were suggestive of metastatic tumor masses. A needle inserted into the right chest disclosed a hard, thickened parietal pleura, and about 50 cc. of bloody fluid were aspirated. The sediment obtained in the centrifuged specimen showed red blood cells and a few large mononuclear ones. No cancer cells were identified. Dyspnea and cyanosis were improved by the

administration of oxygen, but the chest pain was controlled only by frequent hypodermic injections of morphine. There was apparently no marked disturbance in vision; at least, during the intervals when there was no pain, the boy frequently read comic books. His appetite was poor and he lost strength rapidly. On September 16, 1956, coma developed and death occurred the following day.

At postmortem examination, the scalp was found firmly adherent to a bone flap about 12 cm. in diameter in the right parietal and occipital regions. The bone of the flap was discolored yellow and had a series of marginal trephine holes. It was firmly adherent to the surrounding healthy bone. The brain appeared normal except in the right lateral occipital region where it was densely adherent to the dura. It was torn in removing it from the skull, and a cyst approximately 4 cm. in diameter with a bright yellow lining was exposed in the right occipital lobe. The lumen of the transverse sinus of the dura on the right was obliterated by dense fibrous tissue in which there were several white metal clips. Otherwise the dural sinuses were normal. Examination of the abdomen disclosed no abnormality of the liver, spleen, gastrointestinal tract, bile ducts, gallbladder, pancreas, kidneys, suprarenal glands, urinary bladder, or prostate gland. The retroperitoneal lymph nodes in the pelvis and abdomen were unchanged. The diaphragm on the right was hard and fixed at the level of the lower margin of the seventh rib in front. The diaphragm on the left was elastic and was easily displaced to the lower margin of the sixth rib. The pleura of the entire right lung was thickened by hard white tissue and was densely adherent to the chest wall except in the lower lateral portion where a walled-off pocket containing about 100 cc. of blood-stained fluid was found. The parietal pleura was hard, white, and about 1 cm. thick. The apex of the left lung was firmly adherent to the chest wall, and there were also dense fibrous adhesions between the left lung and the pericardial sac. The tracheobronchial lymph nodes were replaced by hard light yellow tissue, forming a mass 7 cm. by 6 cm. by 2.5 cm. The lymph nodes surrounding the thoracic aorta and esophagus were also enlarged and hard. The lining of the esophagus was normal. The lining of the trachea and main bronchi was red and slightly rough. The right lung weighed 740 gm. The apex of the lower lobe was almost completely replaced by hard, nodular, light yellow tissue, and there were smaller nodules scattered throughout all other portions of the lung. The lining of the bronchi which opened into the smaller divisions was red and rough, but the lumens were not narrowed. There was no change in the lining of the pulmonary arteries or veins which opened into the smaller divisions. The lymph nodes at the hilus were enlarged and replaced by hard, light yellow tissue. The left lung weighed 350 gm. A mass in the apex of the left lung measured 3 cm. in diameter and consisted of confluent nodules of hard, light yellow tissue of various sizes. There were smaller nodules distributed throughout the lung. The pulmonary arteries and veins which opened into the smaller divisions were unchanged. The lining of the bronchi was red and rough, but there was no evidence of bronchial ulceration or tumor. The hilar lymph nodes were enlarged and hard. The heart weighed 210 gm. There was no change in the lining of any of its chambers. The heart valves were normal, and the pericardium was smooth and glistening. The coronary arteries and myocardium were unchanged. Examination of the neck showed no change in the thyroid gland. Cervical lymph nodes consisted of soft, gray tissue and were not enlarged.

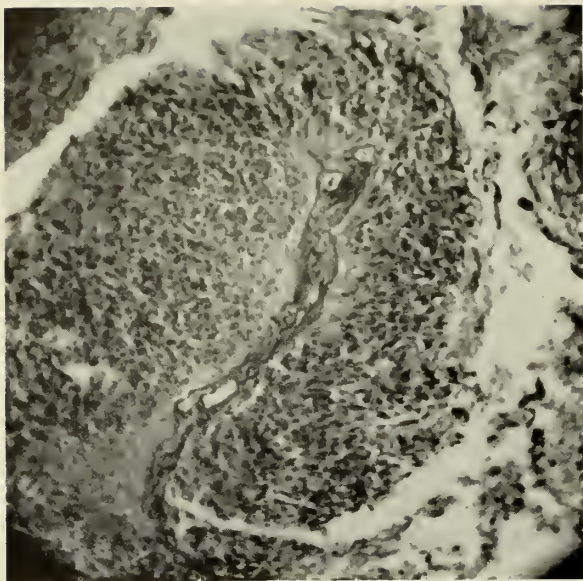


Fig. 3. Tissue from recurrent brain tumor obtained at postmortem examination.

The essential histologic changes were found in sections from the brain, lungs, pleura, and hilar and mediastinal lymph nodes. The following sections were stained with hematoxylin and eosin:

Sections from the right occipital lobe of the brain (figure 3). A markedly cellular tumor tissue is found between the dura and the brain, completely replacing the pia arachnoid membrane. The tumor involves both brain and dura by direct extension. Structure of the tumor is papillary and there are many cyst-like places, some empty, but others distended with a fibrin meshwork or with masses of red blood cells. The tumor cells are long, columnar, and arranged in palisades on branching fibrous stalks or narrow septums containing thin-walled blood spaces. Where the stalks are cut transversely, the tumor cells are radially arranged about the blood vessels. The

cytoplasm of the tumor cells is pink and faintly fibrillar, and in those cells which are adjacent to the blood vessels, long processes extend to and apparently are attached to them. The nuclei of the cells are long, oval, and often slightly indented. They stain deeply with hematoxylin because of the abundant chromatin arranged in fine granules. There are almost no mitotic figures. Occasional nuclei contain large hyaline inclusion bodies. The cells are arranged from 6 to 14 layers deep on the supporting fibrous stalks. Rosettes of cells are not identified. Small tumor masses are present in the lining of the lateral ventricle in sections of the brain taken through the right lateral ventricle.

Lung. In sections from the large mass in the right lung, the lesion follows the same papillary and cystic arrangement as in the brain (figure 4). But, the tumor is nodular because of a pronounced overgrowth of dense fibrous tissue often arranged in wide bands around the tumor cell masses. Tumor cells are scattered in the dense fibrous substance in small groups. In some of the nodules, the glioma cells are swollen and more rounded or spindle-shaped with an abundant hyaline pink cytoplasm and smaller nuclei (figure 5). Transition forms between these cells and the more elongated cells with the fibrillar cytoplasm are identified everywhere. Some of the tumor nodules consist almost entirely of the larger cells which are embedded in an abundant and dense fibrous stroma; but in most of these nodules the transition from tumor tissue, like that in the brain, can be demonstrated. Masses of tumor tissue distend many of the alveoli and also the lymph channels along the larger blood vessels. A few of the larger blood vessels also contain tumor cells.

Lymph nodes. The hilar and tracheobronchial lymph nodes are almost completely replaced by tumor tissue, and the characteristic papillary arrangement is occasionally seen. In the more fibrous portion of the nodes, the tumor cells are of the larger, more rounded or spindle-shaped, hyaline variety. Again, transition forms from characteristic tumor cells are apparent everywhere. The lymph channels surrounding the nodes are distended with masses of tumor cells.

Rib. The bone marrow is normally cellular and the narrow bone trabeculae are unchanged. The attached

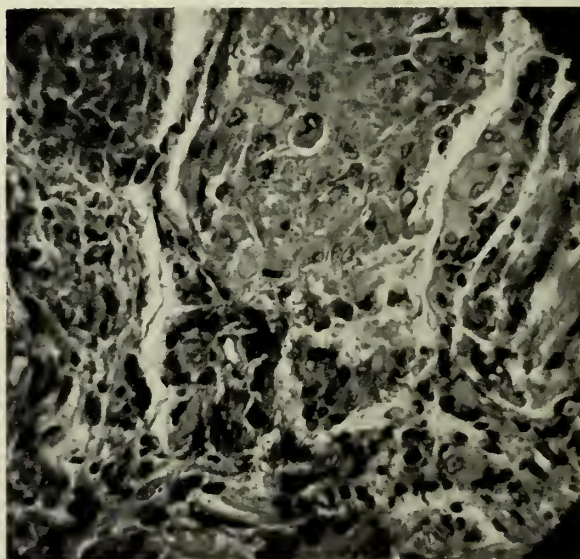
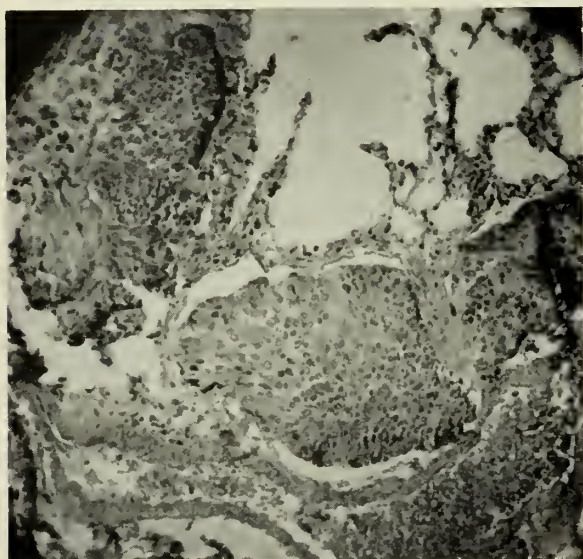


Fig. 4 (left). Metastatic ependymoma in the lungs. Fig. 5 (right). Larger, hyaline, rounded, or spindle-shaped tumor cells from the lungs contrasted with the surrounding more characteristic ependymoma cells. Same magnification as in Figs. 1 and 2.

pleura is as much as 7 mm. thick and densely infiltrated with tumor tissue, again showing all gradations between the cells as found in the brain tumor, and the larger, more rounded or spindle-shaped cells noted in the lungs and tracheobronchial lymph nodes.

Microscopic sections from the prostate gland, liver, thyroid gland, spleen, myocardium, kidneys, suprarenal glands, hypophysis, and pancreas are unchanged and no glioma tissue is observed.

Histologically, this patient's tumor falls into the group of ependymomas belonging in grade III as described by Kernohan and Sayre. The larger hyaline tumor cells found in many of the metastatic lesions apparently represent a change in morphology caused by their new extracranial environment, since these cells are derived from the characteristic ependymoma cells. The glioma was highly malignant as judged by the clinical history and postmortem findings. The lumen of the right lateral and sigmoid sinuses of the dura was apparently obliterated by the surgical procedure, since white metal clips were embedded in this tissue. Unfortunately, histologic examination of this portion of the dura was not obtained, and, therefore, it is not possible to say whether or not the tumor may have gained access to the blood stream through this route. The postmortem findings, however, suggest that the tumor invaded the lungs by way of the blood stream and then metastasized through the lymphatic channels to the hilar and mediastinal lymph nodes and to the pleura. Death resulted from massive lung involvement. Microscopic sections of the brain and lung lesions were examined

shortly after the postmortem examination by Dr. Edwin F. Hirsch, who believed that the pulmonary lesions were metastases from the ependymoma of the brain. The sections were also reviewed by Dr. J. W. Kernohan, who reported that the lesions in the lung were ependymoma histologically identical with the tumor tissue removed from the brain at operation.

SUMMARY

1. An instance of cerebral ependymoma with extracranial metastases is presented.

2. The clinical course followed the pattern seen in many of these patients, namely, long survival and multiple surgical attacks on the primary tumor.

3. Death was caused by metastatic pulmonary disease in a patient who, in his final illness, had no symptoms caused by a recurrence of the cerebral glioma.

ADDENDUM

Since this paper was submitted for publication, an additional report of a glioma of the brain with metastasis into the lung by H. Sikl¹¹ has been reviewed. The patient was a 52-year-old man who was operated upon twice for a tumor in the left frontoparietal region and who died sixteen months after the onset of symptoms. At postmortem examination, there was local extension of the tumor into the dura, bone, and muscle. Metastases were in the thoracic vertebrae, ribs, and lungs.

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DR. CHAUNCEY LEAKE TO DELIVER JOURNAL-LANCET LECTURE

"Drugs Affecting Human Behavior" is the title of the fourteenth annual JOURNAL-LANCET Lecture to be delivered by Dr. Chauncey Leake, associate dean at Ohio State University College of Medicine, Columbus, Ohio. The lecture will be presented April 11 at 8:00 P.M. in the Mayo Memorial Auditorium, University of Minnesota Medical Center.

Dr. Leake was executive director of the University of Texas Medical Branch from 1942 to 1955. He is past president of the History of Science Society, past vice president of the Society for Experimental Biology and Medicine, and director of the American Association for the Advancement of Science. He has contributed much toward development and use of new drugs and anesthetics.



This department of THE JOURNAL-LANCET is devoted to reports on cases in which all the appropriate diagnostic criteria have been employed, the best known treatment administered and the results recorded. It is desired that these case reports be so prepared that they may be read with profit by physicians in general practice, hospital residents and interns and may be of considerable value to junior and senior students of medicine. This department welcomes such reports from individuals or groups of physicians who have suitable cases which they desire to present.

Male Infertility Treated with Desiccated Thyroid

Case Report

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HUMAN FERTILITY VARIES with multiple factors and often may be treated by several methods simultaneously, which makes evaluation difficult. The following case is presented because it represents a situation in which there seemed to be only one major factor, and pregnancy appeared to be the result of a single medication. The case is also of interest because the medication, desiccated thyroid, would not be expected to give results in a large percentage of fertility problems.

CASE REPORT

Mr. and Mrs. P. reported to the Fertility Clinic at the University of Minnesota Hospitals in February 1954, when he was 34 and she was 33 years of age. They had been married five years and had used a contraceptive diaphragm until eight months before reporting.

Mr. P., an only child, was born in England. Nothing is known of any possible fertility problem for his parents. At age 13, he had a "gland disorder" characterized by obesity and drowsiness. He was placed on a high protein diet and improved in a few months. Past history was otherwise noncontributory.

Physical examination of Mr. P. in 1954 showed no significant findings. He had well-developed secondary

sex characteristics including external genitalia. No abnormality was found in routine blood and urine tests and chest roentgenogram. Sperm count was 10 million per cubic centimeter with low motility. Basal metabolic rate was -17 per cent. He had none of the usual clinical findings of hypothyroidism. He had normal pep, alertness, skin, hair, nails, sleep requirements, and bowel function.

Mrs. P. was born in Canada of Icelandic extraction, one of 16 children. Menses were regular and normal and past history was noncontributory. Physical examination, pelvic examination, routine blood and urine tests, and chest roentgenograms were normal. Basal metabolic rates were $+4$ in March 1954, and -3 in December 1955. There was indication of ovulation by temperature charts and by an endometrial biopsy in March 1954, which showed "secretion phase endometrium" on the twenty-sixth cycle day. The Rubin test for tubal patency in March 1954 was positive on the fifth cycle day by graph and shoulder pain.

Mr. P. was treated with 2 gr. daily of U.S.P. thyroid beginning in March 1954, after the B.M.R. of -17 per cent. In May, the B.M.R. was -14 per cent, and he was referred to the University health service for further management. At that time, doses up to 3 gr. of thyroid resulted in some tachycardia and insomnia. In October, when the patient was again taking 2 gr. of thyroid, the B.M.R. was -9 per cent. During this time, repeated sperm counts varied from 10 to 18 million with low motility.

Artificial insemination with the husband's semen was performed at the Fertility Clinic every month except one, from June through December 1954. Dates for insemination were selected by use of the temperature record. The insemination was done on two consecutive days, when the temperature dropped and when it rose. Conception did not result from this procedure.

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It was decided to increase the husband's thyroid therapy to tolerance, not to exceed 4 gr. daily. The dose was 3 gr. late in October 1954, and 4 gr. in December. The next sperm count in March 1955, showed 35 million with 81 per cent motility in the fresh specimen. In April, the patient showed heat intolerance for the first time and tachycardia of 120, and the thyroid dose was reduced to 3 gr. In May, the sperm count was 151 million. Because of insomnia and some continued feelings of warmth, the thyroid dose was reduced to 2½ gr. In June, the sperm count was 157 million, the patient felt well, and the dose was not changed. July 24, 1955, was Mrs. P.'s last menstrual period. Later pelvic examinations substantiated the diagnosis of pregnancy. In October, the sperm count was 144 million. Mr. P.'s B.M.R. was +3 in December, and the thyroid dosage was changed to 2 gr. Therapy was continued with a view to additional pregnancies. Except for the described temporary indications of thyroid overdosage, Mr. P. felt no different on thyroid therapy.

The pregnancy was uneventful except for spotting a few times in the early months. Pregnancy examinations were performed at usual intervals. Premature labor of unknown cause resulted in the birth of a 2 lb., 3 oz. girl at six months. She showed no congenital or other defects and was discharged from the hospital weighing 5 lb. at 2½ months. Subsequent history to the age of 10 months has been normal.

DISCUSSION

In this couple, the only demonstrated factor for reduced fertility was the low sperm count and whatever associated defects accompany low count, such as diminished motility, variation of pH, change in viscosity, and so forth. These other factors will not be discussed. The sperm count probably merely serves as an index of this group of factors, some of which presumably changed on therapy when the count changed. The failure to achieve conception by repeated, timed inseminations while the count was low suggests that the count alone was not the only defect.

The modest lowering of the husband's basal metabolic rate without the usual clinical evidence of hypothyroidism did not permit assumption that there was hypothyroidism with oligospermia as its only manifestation. However, the increase in the sperm count from low to satisfactory levels when desiccated thyroid was the only medication used does suggest this interpretation. This management was used chiefly because there was no other demonstrated defect to try to correct. It is worth noting that persistence was required to secure the change in the sperm count. It was fourteen months from the begin-

ning of treatment to the first satisfactory sperm count and sixteen months to time of conception. Although pregnancy had been planned for twenty-three months, during which time artificial inseminations were also used, conception did not take place until the sperm count became elevated. Pregnancy began about two months after the first increase in the sperm count was observed. It seems sensible to continue thyroid therapy until this couple's family is complete, at which time no indication for continued thyroid therapy is anticipated.

It is not suggested that this treatment would help any except a small percentage of male fertility problems. However, some have expressed the view that thyroid "never" helps male infertility or that it is not worth trying because it is so seldom effective. This case summary is offered as an example that such therapy can succeed. Others have used thyroid empirically or without persistence with resulting failure. Thyroid appears to be indicated when it corrects a specific defect in hypofertility as in other clinical problems. At times, only a clinical trial can establish the presence of such a defect. Many cases, as mentioned, exhibit multiple factors of possible importance to the couple's fertility, so that clinical trials become more complicated than in this case.

SUMMARY AND CONCLUSIONS

Mr. P., 34, and Mrs. P., 33, had a fertility problem for eight months. No defects were demonstrated except that Mr. P. had a sperm count of 10 million with low motility and a basal metabolic rate of -17 per cent. Repeated, timed inseminations over a seven-month period with the husband's semen failed to produce conception while the sperm count was low. Therapy with desiccated thyroid elevated the basal metabolic rate to normal and the sperm count and motility to satisfactory range. Pregnancy subsequently occurred.

Concurrent low sperm count and low basal metabolic rate are indications for a persistent trial of thyroid with adequate but not excessive dosage, regardless of the absence of the usual clinical evidences of hypothyroidism. This approach will not be effective in all of these cases, but when this is the specific defect, no other approach can be expected to succeed.

Responsibilities of the Medical Profession in the Use of X-Rays and Other Ionizing Radiation

Statement by the United Nations Scientific Committee on the Effects of Atomic Radiation

THE UNITED NATIONS GENERAL ASSEMBLY, being aware of the problems in public health that are created by the development of atomic energy, established a Scientific Committee on the Effects of Atomic Radiation. This committee has considered that one of its most urgent tasks is to collect as much information as possible on the amount of radiation to which man is exposed today and on the effects of this radiation.

Modern medicine has contributed to the control of many diseases and has substantially prolonged the span of human life. These results have depended in part on the use of radiation in the detection, diagnosis, and treatment of disease. There are, however, few examples of scientific progress that are not attended by some disadvantages, however slight.

It is now accepted that the irradiation of human beings, and particularly of their germinal tissues, has certain undesirable effects. While many of the somatic effects of radiation may be reversible, germinal irradiation normally has an irreversible and, therefore, cumulative effect. Any irradiation of the germinal tissues, however slight, thus involves genetic damage which may be small but is nevertheless real.

The information so far available indicates that the human race is subjected to natural radiation, as well as to artificial radiation due to its medical applications, to atomic industry and its effluents and to the radioactive fall-out from nuclear explosions. The committee is aware of the potential hazards that such radiation involves, and it is collecting and examining information on these subjects. Radiation due to natural sources has been estimated to cause between 70 and 170 mrem. of irradiation to the gonads per annum in most parts of certain countries in which it has been studied, although higher values are found locally in some areas.

The amount of radiation received by the population for medical purposes is now, in some countries, the main source of artificial radiation and is probably about equal to that from all natural sources.

The committee appreciates fully the importance and value of the correct medical use of radiation in the diagnosis, treatment, and early mass detection of many diseases and in the extension of medical knowledge.

Moreover, it appreciates fully the contribution of the radiological profession, through the International Commission on Radiological Protection in recom-

mending maximum permissible levels of irradiation. As regards those whose occupation exposes them to radiation, the establishment of these levels depends on the view that there are doses which, according to present knowledge, do not cause any appreciable body injury in the irradiated individual; and also on the consideration that the number of people concerned is sufficiently small for the genetic repercussions upon the population as a whole to be slight. Whenever exposure of the whole population is involved, however, it is considered prudent to limit the dose of radiation received by germinal tissue from all artificial sources to an amount of that received from the natural background radiation.

It appears most important, therefore, that medical irradiations of any form should be restricted to those which are of value and importance, either in investigation or in treatment, so that the irradiation of the population may be minimized without impairing the efficient medical use of radiation.

The committee is consequently anxious to receive information through appropriate governmental channels concerning the methods and the extent by which such economy in the medical use of radiation can be achieved, both by avoiding examinations which are not clearly indicated and by decreasing the exposure to radiation during examinations, particularly if the gonads or the fetus during pregnancy lie in the direct beam of radiation. It seeks, in particular, to obtain information regarding the reduction in radiation of the population which might be achieved by improvements in instruments designed by fuller training of personnel, by local shielding of the gonads, by choosing appropriately between radiography and fluoroscopy, and by better administrative arrangements to avoid repetition of identical examinations.

The committee also seeks the cooperation of the medical profession to make possible an estimate of the total radiation received by the germinal tissue of the population before and during the child-bearing age. It considers it essential that standardized methods of measurement, of types at present available, should be widely used to obtain this information, and it emphasizes the value of adequate records maintained by those using radiation medically. The committee is convinced that such information will make it possible to decrease the total medical irradiation of the population, while preserving and increasing the true value of the medical uses of radiation.



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BRISTOL-MYERS CO., 19 West 50 Street, New York 20, N. Y.

Sexual Hygiene and Pathology — A Manual for the Physician, by JOHN F. OLIVEN, M.D., 1955. Philadelphia and Montreal: J. B. Lippincott Co. \$10.00.

In the preface, the author states that this book is designed to fill the needs of practicing physicians, medical students, and certain groups of auxiliary medical workers for information on sexual matters as they are of interest to the physician.

It is divided into four parts. Part I is entitled *Sexuality in Childhood*; Part II, *Sexuality in the Second Decade*; Part III, *Sexuality of the normal adult*; and Part IV, *Sexual Pathology*.

Many of the topics covered in this book will be especially valuable to the physician, as it is often difficult to find any reference to these topics in the usual textbook of psychiatry. As an example, in Part I, *Sexuality in Childhood*, there is a chapter on "The Child as Victim of Sexual Aggression" in which good suggestions are given on how to manage this problem. Part II, on the *Sexuality in the Second Decade* is an excellent discussion on how to handle the various problems pertaining to this subject which adolescents present. Part III, *Sexuality of the Normal*



Adult, is a good coverage on sexuality in the normal adult. Part IV includes a discussion on topics ordinarily not well covered in textbooks of psychiatry. Chapter 21 would be especially helpful in this respect, since such subjects as exhibitionism, voyeurism, sadism, and so forth are discussed as well as the best way to manage these problems.

In general, this book is a fairly complete coverage of both normal and abnormal conditions and functions relating to sex. Perhaps the author has overemphasized the organic and constitutional aspects at the expense of the psychogenic aspects. However, the physician in general practice and in specialties other than psychiatry probably is not interested in psychiatrists' and psychoanalysts' differences of opin-

ion about etiology, but rather in how to treat and handle the various conditions discussed. A bibliography, which is not included, would prove somewhat helpful to many physicians interested in doing further reading.

In summary, this greatly needed book has been well done, and many physicians and all medical students can profit by reading it. The author and publishers are to be commended for having made it available.

JOHN W. SCHUMACHER, M.D.

• *Our Blind Children—Growing and Learning with Them*, by BERTHOLD LOWENFELD, Ph.D., superintendent, California School for the Blind, Berkeley, California, 1956. Springfield, Illinois: \$5.50. Charles C Thomas.

The book is printed on glossy paper with highly legible print. It contains 205 pages and is cloth bound. There are a few illustrations. It is divided into chapters which are entitled:

To Parents; Some Facts You May Want To Know; You and Your Blind Child; As Your Baby Grows; Growing Toward Independence; Attitudes of Parents; Nursery School; Kindergarten; School Age; Understanding

(Continued on page 36A)

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1. Wallace, S. L.: Zoxazolamine (FLEXIN) in Low Back Disorders, to be published.

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BOOK REVIEWS

(Continued from page 34A)

Special Methods of Teaching; Questions Parents Often Ask; Appendix. The book is divided into subheads which makes reading easy, and selected subjects are easily found.

The author has obviously had a great deal of experience with blind children. In this monograph, he attempts to describe the blind child not as he differs from but as he is similar to other children. Dr. Lowenfeld emphasizes the normality of the blind child and at the same time keeps in mind the blindness as a handicap. He is particularly careful to recognize and steer away from areas of sympathy and self-sympathy. On the other hand, he delineates the happiness and well-being available to children who are blind through proper management and through allowing them to live normal lives. His attitude, I think, is well shown by the following paragraph taken from page 101:

"Acceptance of the child and his handicap is the most desirable form of parental adjustment. No parents can be spared the emotional impact that goes with the realization that their child is blind. Natural love for their child and the parents' own feelings of security are the factors most promising for the achievement of acceptance. Although feelings of

resentment against their misfortune and feelings of guilt will not be completely absent, they are comparatively mild and in no way overpowering. If there are other children in the family who have no handicap, it will help to prove to the parents that their child's blindness is not due to a physical failing in themselves and, therefore, relieve possible guilt feelings. Also, the experience of past parent-child relationship and its satisfactions will help to lessen anxieties or feelings of inadequacy in the rearing of the blind child. Accepting parents will regard their task as a challenge and an opportunity for special efforts, for increased resourcefulness, and for interesting and satisfying explorations. These parents recognize that they must give their blind child special opportunities, but they will be careful not to give him special privileges which might make their other children jealous and ultimately turn against their blind brother or sister. They are the ones who succeed in giving their blind child during his childhood and youth those feelings of security and stability which will back him up in any difficulties he may encounter later in life."

Again on page 175, he takes up the subject "Should I punish my Blind Child"? Upon reading this paragraph, it suddenly becomes quite

obvious that a blind child should or should not be punished in exactly the same manner that any other child should or should not be punished. He mentions also in this same paragraph that one is inclined to overpraise blind children, and he speaks out harshly against a gushing kind of admiration which is most undesirable and should be definitely avoided. He discusses the matter of pets with children. He brings up the question of whether or not the parents should learn to read Braille, and strongly recommends it. The problem of explaining sex differences to blind children is covered. These are a few of the many items that are included in this book. There is an appendix on page 193. This is chapter twelve. It is entitled "Informative Reading" and lists many publications associated with the normal children and also blind children. He also lists periodicals that are available for the blind. Furthermore, books on educational facilities for children and organizations associated with blind children are included.

This is an excellent book. Dr. Lowenfeld is an authority on child behavior and on the behavior of blind children. This book contains a wealth of information for parents of blind children, for social workers, for teachers in blind institutions, for nurses, and for physicians who must

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deal with blind children. It has indeed been a pleasure to review this most enlightening monograph.

FRANCIS M. WALSH, M.D.
LEON D. HARRIS, M.D.

The Relationship Between Syringomyelia and Neoplasm, by CHARLES M. POSER, M.D., instructor in medicine (Neurology), University of Kansas School of Medicine, Kansas City, 1956. Springfield, Illinois: Charles C Thomas. 198 pages. \$3.50.

This small monograph is a review of the pathogenesis of syringomyelia. The term was coined by Olliver d'Angers in 1824 and is used by Dr. Poser to refer to any abnormal cavity within the brain stem, pons, medulla, or spinal cord. Hydromyelia is not differentiated from syringomyelia in this report.

None of the theories on the nature of the process leading to syringomyelia are, of course, confirmed. In this report, the author reviews these theories and seems to favor congenital dysraphia as the most likely. To assess the relationship between syrinx formation and neoplasms, he reports on 235 cases. This includes all cases found in the literature of syringomyelia associated with neoplasms of the central nervous system. He concluded that the close relationship between these two lesions can best be explained on the basis of congenital anomalies resulting from faulty closure of the dorsal raphe. He believes the neoplasm and the syrinx are the result of faulty differentiation and are divergent results of one process.

The report is scholarly, precise, and a definite contribution. It will, however, have a limited readership, for only those intimately involved with problems of the central nervous system will find it of interest.

LYLE A. FRENCH, M.D.

American College Health Association News . . .

Dr. and Mrs. Ralph Canuteson of the University of Kansas are at the present time in Norway on a Fulbright exchange arrangement. In addition to a study of the student health services of Norway and the Scandinavian Peninsula, they expect to visit at least three universities in Italy and France and possibly one in Spain.

Dr. Jack Harris has been named to the position of associate medical director, Student Health Service, Iowa State Teachers College, Cedar Falls, Iowa. Dr. Harris was formerly in private practice in Luverne, Iowa.

Dr. Clark Heath of Tufts University Health Service was elected chairman of the New England section at the

annual meeting held December 1, 1956, at the Boston University Conference Center. Dr. Heath succeeds Dr. Samuel E. Leard, Boston University.

The meeting was very successful and included among its registrants a college president and a dean from another of the member colleges.

May we remind all members that the next annual meeting will be in Baltimore, April 25 through 27 at the Lord Baltimore Hotel. You should have received your preliminary programs and hotel reservation cards by this time. Send in your cards and arrange your schedule so you can be present. As this is written everything points to a splendid meeting and a good time for everyone.

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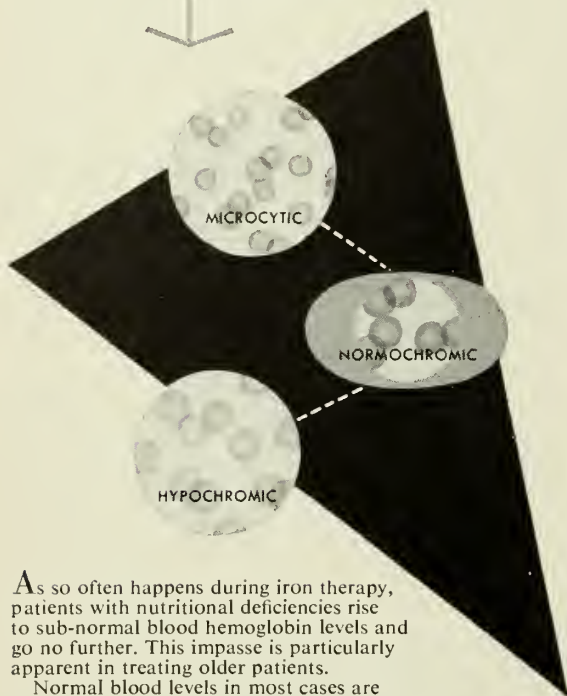
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News Briefs . . .

North Dakota

DR. W. E. CORNATZER, head of the University of North Dakota biochemistry department, was recently awarded a \$7,290 grant for liver research. Dr. Cornatzer had previously received a \$6,804 grant from the United States Atomic Energy Commission and a \$2,000 grant from the Lipotropic Research Foundation for liver study.

DR. MARVIN J. GEIB has been re-elected president of the medical staff of St. John's Hospital in Fargo. Other officers are: Dr. Ralph D. Weible, vice president, and Dr. O. A. Sedlak, secretary-treasurer.

DR. D. J. REICHERT has been named chief of the medical staff of St. Joseph's Hospital in Dickinson. Dr. H. C. Larson was elected vice president and Dr. Gladys E. Martin is secretary.

DR. C. H. PETERS recently joined the Quain and Ramstad Clinic in Bismarck. Dr. Peters is a fellow of the American College of Physicians, certified as a specialist by the American Board of Internal Medicine, a member of the Sixth District Medical Association, and on the Council of the North Dakota Medical Association.

DR. JACK EHRENREICH is a new member of the Minot Eye, Ear, Nose, and Throat Clinic. Dr. Ehrenreich assumed his duties at the clinic shortly after leaving the United States Air Force where he was in charge of ear, nose, and throat surgery at Clark Air Force Base near Manila in the Phillipine Islands. He received both a degree in dentistry and medicine at the University of Buffalo, Buffalo, New York, spent several years of training at various hospitals in the East, was an instructor in ear, nose, and throat surgery at the Ohio State Hospital, and spent one month with the Minot Eye, Ear, Nose, and Throat Clinic before entering the service.

DR. CHRIS N. CHRISTU recently joined the pediatric department of the Fargo Clinic. After a pediatric internship at Johns Hopkins Hospital in Baltimore, Dr. Christu served a residency at the Mayo Clinic for two years, and then practiced eighteen months in West Memphis, Arkansas before joining the staff of the Fargo Clinic.

DR. RAFAEL ALVAREZ of Puerto Rico is the newest staff physician at the Minot Veterans Administration Hospital. Dr. Alvarez was formerly chief of surgery at a district hospital in Puerto Rico.

DR. JAMES V. MILES, JR., has returned to the DePuy-Sorkness Clinic in Jamestown after a leave of absence during which he completed specialty training in pediatrics at the Mayo Clinic. His practice will be limited to infants and children.

DR. C. D. FRANCIS, a Stanley physician, has closed his office to practice industrial medicine under civil service in Bremerton, Washington.

Minnesota

THE CROOKSTON CLINIC recently opened the doors of their new quarters revealing the latest innovations in modern facilities. The clinic is housed in a new 1-story building and boasts the most modern decor in the spacious reception room, 8 consultation rooms, laboratory,

The Journal Lancet

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FOREWORD

THE STUDENTS' HEALTH SERVICE of the University of Minnesota was a pioneer in screening college students for the presence of tuberculosis and other chest diseases. An article in the current issue by Doctors Ruth E. Boynton, Harold S. Diehl, and J. Arthur Myers presents a summary of the results of this valuable program over a thirty-six year period which should prove of great interest to physicians, students' health service staffs, college administrators, and all tuberculosis workers, both medical and nonmedical. I have the privilege of being one of those statistics — a statistic with a negative sign, I am happy to report, in contrast with a number of my less fortunate classmates of the roaring twenties at the University.

As a result of a change in editorial policy, articles devoted primarily to diseases of the chest will be scattered over several months, beginning with this issue, rather than being concentrated in this particular issue. This change in policy seems desirable, not only because it may make each issue of greater all-around interest to all who read THE JOURNAL-LANCET, but also because it reflects the growing integration of tuberculous treatment in the practice of medicine as a whole.

I feel confident that this change in policy will not be misinterpreted as indicating that the tuberculosis problem has been completely solved. The progressive leveling off of the death rate has been a sobering observation to those who had assumed that the new drugs would be a quick solution of the tuberculosis problem. The average annual decrease in the death rate from 1951 to 1953, when isoniazid first came into general use, was 22 per cent. From 1953 to 1954, the drop was 17 per cent. From 1954 to 1955, 7 per cent, and an estimate from 1955 to 1956 is only 4 per cent. Furthermore, the decline in the development of new active cases has not been as precipitous as that of the death rate.

Particularly in states in the Midwest where infection is less prevalent than in most other communities, most of the new active cases are appearing among those who are already infected; in other words, among the reactors to tuberculin. This not only makes the tuberculin reaction even more important than it has been in the past, but it also has stimulated research to see if it might be possible to reduce the rate of breakdown among reactors through the prophylactic use of certain drugs or a combination of drugs.

Although, personally, I am skeptical that any of the drugs or combination of drugs we have at present can meet the critical criteria for such mass use, I feel that limited, carefully-controlled studies of such possibilities are definitely in order, and the National Tuberculosis Association is cooperating with the United States Public Health Service in studies currently being conducted by the Service along this line. However, until such a possible shortcut to our goal of eradication of tuberculosis is practical, we must continue without relaxation our slower but proved program of detection of infectious cases of tuberculosis. Adequate treatment and segregation must follow until these cases become noninfectious, and subsequent careful supervision must continue.

JAMES E. PERKINS, M.D.

Managing Director, National Tuberculosis Association

Primary Neurogenic Tumors of the Lung

LEW A. HOCHBERG, M.D., AND ALVIN A. BAKST, M.D.

Brooklyn, New York

PRIMARY NEUROGENIC TUMORS of the lung are very uncommon. Because of their rarity, we are reporting our experiences with two such cases.

Judging from the cases reported to date, these tumors are relatively asymptomatic and are discovered during the "routine" roentgenographic examination of the chest. It is conceivable that should such tumors originate near the surface of the lung, they could cause pleuritic pain. Moreover, should they be situated in the parahilar portion of the lung and are of sufficient size, they may impair cardiorespiratory function.

Pathologically, these tumors resemble neurogenic tumors arising in other areas. Broadly speaking, they fall into two main groups: (1) those which arise or mimic the histogenesis of the sympathetic ganglia, neuroblastoma, and ganglioneuroma, and (2) those which arise from the nerve sheath, that is, nerve sheath tumors (benign and malignant) and the neurogenic sarcoma.

The neurogenic tumor has been found in almost all parts of the lung. Bartlett and Adams¹ reported a case in which the tumor occurred in the distal part of the left main bronchus. In one reported by Ceccarelli and Scarpa,² the tumor arose in the left upper lobe. Petriat and associates³ reported one confined to the left lower lobe. Diveley and Daniels⁴ described a case in which the growth was located within the substance of the right middle lobe. In one of our cases, the tumor was confined to the posterior segment of the right upper lobe, and, in the other, it was situated in the posterior basilar segment of the right lower lobe.

Roentgenologically, these tumors present well circumscribed round or oval-shaped densities with either regular or smoothly scalloped borders. They vary from approximately 1 to 5 cm. in diameter. Although they are usually of uniform density, they may contain focal areas of calcification.

Since the exact nature of the histopathology of these tumors can only be determined microscopically, surgical extirpation is warranted. The extent of pulmonary resection depends upon the surgeon's convictions at the operating table and the results of frozen section studies, should they be performed. In benign tumors, simple enucleation or segmental resection may suffice, whereas, in malignant lesions, as much tissue should be removed as is consistent with adequate surgery. The unnecessary sacrifice of lung tissue should be condemned. On the other hand, the presence of an intraparenchymal lesion, presumably tumor, may well necessitate the performance of a lobectomy.

Case 1. A 52-year-old man entered the Evangelical Deaconess Hospital on April 14, 1952, with a history of pains in the right scapular area of about two weeks' duration. The physical examination was negative. A roentgenographic examination of the chest (figure 1) disclosed an ovoid opacity in the seventh intercostal space in the paravertebral area of the right hemithorax. Two days later, an exploratory thoracotomy was performed, at which time a well circumscribed mass was found within the substance of the posterior segment of the right upper lobe. The tumor was enucleated. The pathologist reported on the tumor (figure 2) as follows: The tumor mass measures 4 by 3.5 by 2.5 cm. It is encapsulated, hard, pearly white in color, and has a fibrous appearance and feeling. Microscopically, it is composed of interlacing bundles of fibres in a wavy pattern. Impression: neurofibroma.

Case 2. A 53-year-old asymptomatic white man entered the Jewish Hospital of Brooklyn on June 27, 1956, stating that a pulmonic lesion had been discovered during a routine chest roentgenogram. The physical examination was noncontributory. Chest roentgenogram (figure 3) revealed an oval-shaped density in the inferoposterior aspect of the right chest just above the diaphragm. Multiple small calcifications were visible in the right upper lobe.

Exploratory thoracotomy revealed a walnut-sized firm mass in the posterior basilar segments of the right lower lobe with superficial umbilication. The focal areas of calcification within the upper lobe were confirmed. A right lower lobectomy was performed. The pathologist reported the specimen (figure 4) as follows: The specimen consists of the right lower lobe, in which a tumoral mass is situated in the posterior portion of the base of the specimen. The tumor is well circumscribed, and the cut surface is pink-red, smooth, and glistening. On opening the bronchus, the tumoral mass is attached to its external surface. Microscopic examination reveals that it consists of spindle-shaped cells arranged in a palisading manner about a dense hyalinized fibrous

LEW A. HOCHBERG is on the staff of the Evangelical Deaconess Hospital and the Jewish Hospital of Brooklyn. ALVIN A. BAKST is on the staff of the Jewish Hospital of Brooklyn.

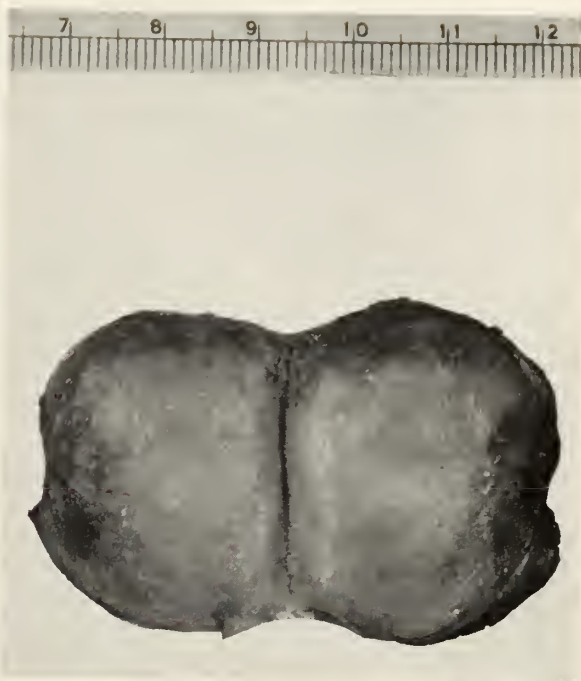


Fig. 1 (*left*). Roentgenogram of chest disclosing an ovoid tumor in the seventh intercostal space in the paravertebral area of the right side. Fig. 2 (*right*). Enucleated neurofibroma. Same case as figure 1.



Fig. 3 (*left*). Chest roentgenogram revealing an oval-shaped tumor in the base of the right lower lobe immediately above the diaphragm and superimposed on the eleventh rib. Fig. 4 (*right*). Resected specimen of the right lower lobe. Same case as figure 3.

stroma. The cells are orderly in arrangement with places forming what appears to be Verocay-like bodies. Impression: nerve sheath tumor (neurilemmoma).

SUMMARY AND CONCLUSIONS

Two cases are reported in which intraparenchy-

mal pulmonary neurogenic tumors were successfully resected. One patient was totally asymptomatic, whereas the other called attention to the lesion by the presence of persistent chest pain.

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EPIDERMOID LUNG CANCER seems to occur more frequently among women who smoke than among those who do not. Incidence of pulmonary adenocarcinoma is probably not significantly affected by smoking.

Smoking habits were determined for 105 women with lung cancer, including 41 with epidermoid carcinoma, 41 with adenocarcinoma, 14 with anaplastic carcinoma, and 9 with unclassified carcinoma, and for a control group of 1,304 women with cancer or benign tumors at sites other than the respiratory or upper alimentary tract.

Of the patients who had epidermoid carcinoma, almost 60 per cent were smokers; on the basis of the control group data, adjusted for age, only 25 per cent would be expected to be smokers. Almost half of the 60 per cent who smoked used more than a pack of cigarettes daily; less than 10 per cent would be expected to smoke so heavily if the epidermoid group corresponded with the control group. Similar differences from the controls were observed in the patients with anaplastic carcinoma. With adenocarcinoma, however, actual and expected numbers of smokers did not differ significantly.

Epidermoid cancer appears at an earlier age in women who smoke; the median age for smokers with epidermoid lesions is fourteen years less than the median age for nonsmokers.

Comparison of 205 men and 205 women without lung cancer shows that percentage of smokers is significantly higher for men in all age groups. About half the women under 50 and most women over 50 years of age are nonsmokers; most men over 40 use tobacco. After 40 years of age, the percentage of smokers who use more than a pack a day is significantly higher for men than for women. The differences in smoking habits are consistent with an incidence of lung cancer among men of about 4 times that among women—a rate equal to the observed sex ratio.

ERNEST L. WYNDER, M.D., IRWIN J. BROSS, Ph.D., and WALTER E. O'DONNELL, M.D. (Sloan-Kettering Institute, New York City), and JEROME CORNFELD (National Institutes of Health, Bethesda, Md.). Lung cancer in women. *New England J. Med.* 255:1111-1121, 1956.

The Practicing Physician and Pulmonary Cytology

SEYMOUR M. FARBER, M.D., and
SAMUEL L. PHARR, M.S.

San Francisco, California

THE RISING INCIDENCE of bronchogenic carcinoma in recent years, particularly in men over 35 years of age, has emphasized the need for additional methods for early diagnosis in this disease. An x-ray film of the chest is invariably the first step in investigating an unexplained chest problem, and, if initial roentgenologic findings are not contributory, it may be the only significant diagnostic procedure performed during the unfortunate "watch and wait" period of tumor development. Bronchoscopy may be performed in a few cases of suspected cancer, but visualization of a lesion by this method is possible in approximately one-third of the patients with pulmonary malignancies. Surgical exploration of the chest is still rarely used in the search for an early malignant bronchial lesion.

The immediate requirement in cases of suspected lung cancer is to elicit reliable *morphologic* evidence of malignancy. At present, bronchial biopsy is the most widely used method, but diagnosis by this means is possible only if the tumor is of significant size and lies in a plane of roentgenologic or bronchoscopic visualization. These restrictions seriously limit the number of surgical candidates.

CYTOLOGIC STUDY OF SPUTUM

A decade of experience in pulmonary cytology has constantly strengthened our confidence in the accuracy of morphologic observations in detecting malignancy from stained smears of sputum. When conducted by experienced workers, the cytologic study of sputum and bronchial secretions is highly accurate and leads to the detection of 90 per cent of cases of lung cancer.

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Less than 1 per cent error can be expected among positive cytologic reports. Unfortunately, utilization of this excellent diagnostic procedure does not provide the total answer for achieving effective therapy in lung cancer. At present, surgery and irradiation — either singly or combined — are the only methods which have been successful in treating pulmonary cancer, but the efficacy of each is limited by the high incidence of early metastasis in bronchogenic carcinoma.

The current success of pulmonary cytology to detect early lung cancer has unavoidably positioned the "cart before the horse" as far as its potential clinical application is concerned and has indicated the need for new developments in the treatment of cancer. Considerable evidence indicates that basic research will provide new therapeutic agents, and, until such time, pulmonary cytology can be of valuable, even if limited, clinical assistance in diseases of the chest. Cytology often provides the earliest evidence of malignancy and can offer prognostic information when it is possible to indicate the tumor cell type. A primary pulmonary neoplasm can often be distinguished from a secondary spread to the lung, and, occasionally, the primary site of a metastatic growth can be suggested on the basis of cellular morphology. A number of nonmalignant pulmonary diseases can be recognized by cytologic study of sputum when lung cancer may be a clinical consideration. Pulmonary cytology also offers a precise method for evaluating the effectiveness of therapy through follow-up sputum studies. In future application, there is an intriguing possibility that the cytologic identification of tumor cell type will be of value in the selection of therapeutic agents.

Pulmonary cytology is considerably more difficult than exfoliative cell studies from the female genital tract. When sputum is raised in sufficient

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quantity to spread upon a slide, there is always a pathologic basis for its presence. True sputum always contains mucous strands, pus, and histiocytes which outnumber and obscure the cells from bronchial epithelium. In addition, many specimens contain large numbers of red blood cells and quantities of fibrin, which further hinder the microscopic search for malignant cells. While it is possible to describe the cytologic findings in a "normal" vaginal smear, there is no counterpart in pulmonary cytology. The cellular alterations observed in some nonmalignant pulmonary diseases can be deceptively similar to those seen in malignancy. This potentiality is emphasized by the high incidence of pulmonary diseases in any patients who raise sputum.

THE PHYSICIAN'S ROLE IN PULMONARY CYTOLOGY

It is not generally feasible for the practicing physician to attempt to make pulmonary cytologic diagnoses. This type of diagnosis not only requires months of intensive training but, more important, *daily* experience in exfoliative cytology. The cytologic distinction between *typical normal* and *typical malignant* cells can be made after very little training and experience, but the precise distinction between *atypical nonmalignant* and *poorly differentiated malignant* cells is not only more difficult, but more representative of problems the pulmonary cytologist encounters.

Although the microscopic examination of stained sputum smears is most successful when conducted by trained cytologists, the practicing physician plays a remarkably important role in initiating pulmonary cytologic studies. The selection of patients is of obvious importance; the value of complete instructions to patients for sputum collection is less apparent but, if neglected, can defeat results regardless of the cytologist's skill in interpretation. Accurate cytologic results depend in great part upon the cooperation and *understanding* of the patient. The instructions to the patient should emphasize that a true sample of sputum must be produced by deep cough; otherwise, in his willingness to cooperate, the patient may submit saliva or nasal secretions. Saliva can usually be distinguished from sputum by gross examination and discarded as unsatisfactory. The tenacious nasal secretions which the patient has aspirated from the pharynx may resemble sputum by both gross and microscopic examination. The short time spent in carefully instructing the patient on the hows and whys of sputum collection is more than compensated by the increased accuracy which results from cytologic study of true sputum.

In selecting patients for pulmonary cytologic study, the physician unfortunately is limited by several nonmedical factors. The availability of facilities and trained cytologists has seriously restricted the application of this diagnostic procedure which, until recently, was performed only in larger medical centers. A second restriction has resulted from the cost to the patient for the examination of an adequate number of specimens. A single specimen is, statistically, quite inadequate for the detection of cancer. In our own experience, only 45 to 50 per cent of cases of pulmonary cancer are discovered when only 1 sample of sputum is examined. A study of 3 separate specimens increases this accuracy to 65 per cent, and a study of 5 separate specimens raises it to 90 per cent. Although our primary aim has been to establish maximum accuracy in our cytologic studies, we have been tremendously impressed with the clinical importance and interest which has resulted from the broad use of this procedure in our chest service.

TECHNIC

The relative merits of cytologic study of secretions obtained by bronchoscopy versus sputum have been widely discussed. We have found that cytologic study of a series of sputum specimens approximately doubles the result we obtain by similar study of a single bronchial aspiration. We have been interested in the success reported by others with cytologic studies of bronchial aspirations and washings and believe that our poor results could be improved by having the pathologist or cytologist attend bronchoscopy, watch over the collection of the secretion, and select and smear the material himself. The chief reason for preferring sputum for cytologic examination, however, is that it enables us to study patients with minimum symptoms which do not indicate bronchoscopy.

The verbal instructions to patients for sputum collection, are supplemented in our laboratory by the following printed instructions:

INSTRUCTIONS TO PATIENTS FOR SPUTUM CYTOLOGIC STUDY*

(*This is a special test which requires a fresh morning specimen of sputum on 5 separate days.)

1. *Sputum* is material from deep down in the chest and can only be obtained by deep cough.
2. *Saliva* is the watery fluid in the mouth and is NOT desired in this test.
3. *Postnasal drainage* is the thick material which drains down from the nose and collects in the back of the throat, especially during the night. This should be cleared from the throat and DISCARDED before coughing to obtain sputum specimen.

Directions: 1. In the morning before eating, clear your throat and discard any material present.

2. Breathe deeply 8 to 10 times and cough forcefully. Collect the sputum obtained in this way in the pasteboard carton provided.
3. A small amount of sputum is satisfactory for study. Do not submit a specimen unless it has been raised from deep in the chest.
4. The specimen will be collected early in the morning by the nurse or technician.

Three smears are prepared from each specimen, and, while it is desirable to smear and fix the slides soon after collection, a delay for as long as five hours does not appreciably alter cellular preservation. An attempt is made to select 3 different types of material from each specimen with a particular interest in searching for bloody flecks or cheesy particles. Smears are prepared by introducing a pea-sized fleck of sputum upon a clean glass slide with a plain, untipped wooden applicator stick. Excess material clinging to a selected portion of sputum can be severed by "sawing" it against the sharp edge of the glass slide with the long axis of the applicator stick. The sputum can then be streaked over two-thirds of the surface of the slide or, preferably, pulled apart and spread to an even thickness over the same area. Cytologic smears of sputum are often made too thin rather than too thick. A moderately thick smear is preferred since the Papanicolaou staining method allows visualization of individual cells which lie in thick areas of mucus or fibrin, and often the most significant cells are seen in such areas. Immediately after preparation, the smeared slides are placed into a fixative consisting of equal parts of 95 per cent ethyl alcohol and ethyl ether. The insertion of a paper clip on the blank end of each slide prevents the slides from sticking together and insures uniform fixation. Care should be taken to place the slides into the fixative solution *gently* to avoid dislodging material by striking the bottom of the container with the slide. The smears should remain *undisturbed* in the fixative for a minimum of one hour. They may remain in the fixative indefinitely, or, after one hour, they may be stained or sent elsewhere for staining and screening. If it is necessary to mail the slides to another city for processing, they can be air-dried and packaged after one hour's fixation, since postal regulations forbid mailing a flammable solution such as ether-alcohol. We recommend packing the dried, fixed smears in a standard flat mailing carton or separating them with paper clips and packaging them in mailing cylinders protected by cotton or soft tissue. Although cytologic smears which have dried after fixation are never as receptive to the Papanicolaou staining procedure as the smears which have remained in a liquid medium, they are quite satisfactory for diagnosis.

DISCUSSION

The value of consultation between the clinician and the radiologist in interpreting the nature of chest lesions is well established, and often the application of special technics and experience is necessary for solution. A similar situation applies to the assistance which can be achieved by increased use of pulmonary cytology and consultation between the physician and the cytologist. Even in nonmalignant pulmonary diseases, a diagnostic clue may be obtained from cytologic examination of the sputum. This is particularly true where asthma, lipid pneumonia, or pulmonary infarction is concerned. Asbestos bodies, spherules of coccidioidomycosis, echinococcal scolices, or similar material is, of course, diagnostic. Still more important is the finding of tumor cells where such had not been expected.

The finding of malignant cells in the sputum is the most revealing of the pathologic changes in carcinoma of the lung, particularly in the early stages. The ciliary action of the bronchial epithelium during the night produces a mixed representative sample of the exfoliating cells from both lungs in a morning specimen of sputum. Bronchoscopic aspiration, on the other hand, limits one to a relatively small portion of the bronchial tree, and the required collection of repeated samples of morning sputum is much less difficult and less expensive for the patient than repeated bronchoscopies.

Few experiences in clinical training are more rewarding than that of reviewing the material found in a cytology laboratory. By this, the possibility of the earliest diagnosis of pulmonary neoplasms becomes an actuality instead of a mere stated fact. Furthermore, the correlation of the appearances of cells in sputum with other clinical findings provides the physician with a much greater understanding of the natural history of lung cancer and, thus, may open up new avenues of therapeutic approach.

SUMMARY

Pulmonary cytology is a practical diagnostic procedure which is applicable to collection in an office practice. Training and experience are essential for interpretation of smears, and care must be taken in the collection of sputum specimens to insure accurate results. While only half the patients with pulmonary malignancies are detected by examination of a single sputum specimen, a series of 5 specimens will disclose 90 per cent of cases of lung cancer. Positive findings aid in deciding on surgery or irradiation at an earlier time, and the cytologic identification of tumor cell type is of prognostic value.

Myxedema Heart

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GROSS ABNORMALITY of the heart in myxedema was described by W. M. Ord in 1880,¹ but it is Hermann Zondek² with whose name cardiac manifestations of myxedema is generally associated since he described this condition in 1918. These manifestations known as myxedema heart consist of: enlargement of the heart, feeble heart sounds, diminished amplitude of pulsation, slow heart rate, normal blood pressure, and reduced voltage of the electrocardiogram. All these findings were found to be reversible with thyroid therapy and were explained by cardiac dilatation.

Many observations have since been made confirming Zondek's findings, although the pathogenesis of cardiac enlargement has been a matter of some disagreement in the literature, especially regarding associated pericardial effusion.

Kern and associates,³ Schmidt,⁴ and Paul and Roof⁵ published case reports, discussed pathogenesis, and concluded that pericardial effusion is the commonest cause of cardiac enlargement in myxedema, while Mussio-Fournier and associates⁶ held that an effusion is a minor factor in the myxedema heart.

In the cases of the patients whose reports follow, fluoroscopic and roentgenographic configuration of cardiac silhouette would undoubtedly suggest pericardial effusion, although no pericardial exploration was tried and subsequent progress has proved this to be unnecessary.

One of these cases is of special interest because of the additional findings of complete heart block, pronounced abdominal protuberance, and severe anemia.

Heart block has not been recorded in myxedema so far in recorded literature. Pathologic changes in the myxedema heart as described by various authors are as follows: interstitial myocarditis, thickening of adventitia of the arteriole in London Clinical Society's report,⁷ interstitial edema of the myocardium and pseudohypertrophy by Means and associates,⁸ atheromatous changes of coronary arteries by Higgins,⁹ and hydropic vacuolation with loss of striation and fragmentation by Ladue.¹⁰

Conduction bundle, being a specialized mus-

cular tissue, is likely to undergo similar changes with degeneration of the sarcoplasm. Different types of conduction defect, such as delayed conduction, bradycardia, or heart block might be explained on the basis of these pathologic changes. It is surprising that such cases have not been recorded more frequently. Case 1 showed the evidence of heart block only transiently. If cardiograms were repeated more often in myxedema heart, possibly more cases of heart block would be recorded.

Bradycardia, low voltage curve, and flat T-wave are all only expressions of the defective conduction. This conduction defect also indirectly proves myocardial changes in addition to pericardial effusion. These changes are explained on the basis of deficient oxygenation to the heart muscle followed by degenerative changes and increase in capillary permeability with production of interstitial edema.¹¹ Substitution of thyroid by changing the metabolism reverses the degenerative condition of cardiac muscle and permeability of the capillary.

Abdominal protuberance with umbilical hernia is not as common a feature in adults as in cretins, but Bastenie,¹² from a study of 29 cases of severe myxedema, describes intestinal disturbances which may develop from simple constipation to the development of megacolon and from abdominal distention to intestinal paresis.

These two cases are, however, described more as a diagnostic problem to the clinician than for their pathologic changes.

Case 1. Mrs. H., a 39-year-old mother of 3 children presented herself January 4, 1956, with signs and symptoms of congestive cardiac failure. Her history dates back 7 years, when, during her last pregnancy, she developed hypertension with albuminuria. However, her blood pressure was recorded normal after delivery. On the advice of her family physician, she had had her tubes ligated in 1953, but was reported to have had blood transfusions twice before and once during the operation, evidently to combat severe anemia. She had noticed gradual protuberance of her abdomen since the birth of her second child nine years before, which simulated abdominal hernia, and she was given an abdominal belt by a surgeon. About one and one-half years ago, she started to have menorrhagia, for which she consulted a specialist in gynecology in July 1955 and was found to be severely anemic with a hemoglobin of 35 per cent. With hormone therapy for three months, her menorrhagia was controlled. Her family physician pre-

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scribed various antianemic drugs from time to time. She experienced feelings of excessive cold for the last three years and had to use an electric heater even in this tropical climate. She admits that her power of concentration and memory were gradually becoming impaired and she could not take much interest in family matters, including children and husband. She also complained that her husband neglected her and did not take care of her health properly, which so disturbed her mentally that she had to leave her home and, with the help of her parents, she came to Medical College Hospital for treatment. She attributes her recent illness to the maltreatment of her husband and the cause of her "heart trouble," which developed three months ago when she started to have orthopnea especially at night. One month prior to hospitalization, she noticed swelling of her legs and difficulty in breathing on accustomed exertion. She was admitted under a specialist to the hospital and was detained for about two months. Her blood pressure at this time was reported to be 170/110. A chest roentgenogram showed pronounced enlargement of her heart. An electrocardiogram revealed complete heart block. She was treated with hypertensive drugs and digitalis with insignificant improvement and was discharged as a cardiac invalid on January 2, 1956. She consulted me on January 4, 1956.

On clinical examination, the patient was unusually heavily clothed. She was pale, and her face was round and full with pronounced puffiness of her eyelids. Her hair was scanty over the skull and eyebrows. Her skin was dry and rough. On questioning, she admitted she had lost much of her hair, but she could not specify how long her skin had been so rough. Her voice was low pitched. On removal of the abdominal belt, a markedly protuberant abdomen was noted, although no free fluid could be detected. The liver was enlarged two fingers below the costal margin. She could not lie down flat even for a minute. Pulse rate was 84; blood pressure was 168/112. The cardiac apex could be located with difficulty at the fifth intercostal space on the left anterior axillary line. The heart sounds were faint with a systolic murmur over all the areas.

Screening of the chest showed a hugely enlarged heart with very feeble pulsation on the left border and without any pulsation on the right border of the cardiac silhouette. Diagnosis of myxedema was obvious, although it had been overlooked for three or four years.

Investigation showed hemoglobin 60 per cent, red blood cells 2.9 million per cubic millimeter, white blood corpuscles 4,900 per cubic millimeter (polymorphonuclears 61 per cent, lymphocytes 39 per cent). Urine showed a trace of albumin but no casts. Plasma cholesterol was 430-mg. per cent. Basal metabolic rate was -36 per cent. Electrocardiograph flat T waves were in all leads with low voltage.

The diagnosis of myxedema was thus confirmed, and she was put on $\frac{1}{2}$ gr. of dried thyroid twice daily with gradually increasing doses. Within a week, her edema disappeared, and urinary output increased. She could now lie down flat. Within a fortnight, with 3 gr. of thyroid, she became physically and mentally active and showed interest in her family. Her appearance became brighter. The heart shadow was smaller. The electrocardiogram showed an erect T in most of the leads. She is now leading an active life free from symptoms. Her hair has regrown. Pulse is steady at -70 per minute, and blood pressure varies from 125/80 to 140/80 mm. Hg. Her appearance and a roentgenogram of her chest two months later were absolutely normal.

Case 2. Mr. E., A 40-year-old sub-registrar, attended

the outpatient department of Dacca Medical College Hospital in March 1956 complaining of persistent swelling of the body together with exertional dyspnea and a tired feeling for one year's duration. He consulted various practitioners and tuberculous effusion was diagnosed on the basis of roentgen findings. Streptomycin therapy was advised. Six months ago, he started the treatment but could not tolerate more than 3 injections because of allergic reactions consisting of redness of the face and urticaria. Inquiry about his past illness revealed that he had been lethargic since 1942. He suffered from asthma in 1947, for which he was given 6 injections of Acetylarsan. In 1949, he took frequent leave from his government position without sufficient reason and disciplinary action was taken against him. He was reinstated in the service through the influence of a friend but could not work satisfactorily due to depression and lack of interest in his work. Six months ago, one of his friends told him that his face was swollen, and he consulted a town doctor who arranged for roentgenograms. His disease was diagnosed as pleural effusion, but, as the treatment advised could not be continued because of his reaction, he came to the hospital.

Examination revealed an adult male with definite puffiness of the eyelids, thick lips, and dull appearance. His face, which was expressionless, was very pale. His voice was thick; cerebration was slow; and his skin was dry and rough. There was nonpitting edema of feet and legs. His pulse was 56; blood pressure was 135/80; and an apical impulse was located with difficulty in the fifth space 1 in. lateral to the midclavicular line. The heart sounds were feeble. Other systemic examinations were essentially normal. Blood examination showed hemoglobin 75 per cent, red blood cell count 4 million, and normal leukocyte count. Roentgenogram of the chest revealed evidence of cardiac enlargement with fluid in the pericardial and pleural cavity. Blood cholesterol was 550 mg., and basal metabolic rate was -32 per cent. With thyroid therapy, he showed distinct improvement both physically and intellectually. Roentgenogram of the chest one month later revealed a pronounced change. He has been working satisfactorily for the last three months on 2 gr. of thyroid as a maintenance dose.

DISCUSSION

Both of these cases support the view that when myxedema is sufficiently advanced to cause serious illness, the condition has usually been present for a long time. "Myxedema is a condition so easily treated in its early stages, yet in its late stages, it is one of the most difficult therapeutic problems in medicine," remarked the *British Medical Journal* in the editorial column in 1955.

In case 1, it can be presumed that the anemia, which required blood transfusion in 1953, was due to thyroid deficiency. Severe anemia in myxedema was noted in many cases in the series described in London Clinical Society's report on myxedema in 1888. Later, Stone¹⁴ and Bomford¹⁵ made extensive studies on anemia in myxedema.

Thyroid deficiency should be considered in cases of severe anemia, especially if no obvious etiologic factor is apparent.

Although cardiac enlargement is a well-known complication in myxedema, diagnosis is fre-

quently missed for a considerable length of time. Paul and Roof,⁵ while reporting 2 cases of myxedema with pericardial effusion, analyzed 44 cases from the literature. Pericardial effusion had been present as long as three to sixteen years in 5 patients. Similar long histories were noted by Weyher¹⁶ and Pathy.¹⁷ Two other serious and often fatal conditions, myxedema coma and myxedema psychosis, are known to complicate thyroid deficiency. Often these conditions are considered primary diseases and are treated as such, and irreversible change has often taken place by the time the diagnosis is made.

In September 1949, illuminating editorial comment was evoked in the *British Medical Journal*¹⁸ after publication of Asher's¹⁹ series of Myxedematous Madness. It read, "of his 14 patients, at least 9 were admitted to the hospital without diagnosis of myxedema. Dr. Asher is naturally concerned with patients in whom mental symptoms were dominant, but his illustrations show that the characteristic myxedematous facies was not lacking He rightly says that fault lies in failure to recognize myxedema rather than the psychosis which accompanies it."

DIAGNOSIS OF MYXEDEMA

Both of the patients who came to me had obvious cases of myxedema. The puffy face with baggy eyelids; the scanty, lusterless hair; the thin outer eyebrows; the dry, rough, thick skin; the dull, apathetic look; the slow heavy movements; and the sluggish mental response were the most characteristic diagnostic data.

Still, the diagnosis was overlooked. Simpson,²⁰ in Price's book on medicine, mentioned that many patients will first be seen by a psychiatrist, although the disease must have been present for some time. Others will seek help from a gynecologist because of menorrhagia. Again, the appearance of the patient may lead to the diagnosis

of anemia confirmed by blood examination, but the other features should not be overlooked.

These 2 patients were seen by a gynecologist, cardiologist, physiologist, and internist, all of whom failed to make a correct diagnosis.

How can these pitfalls in diagnosis be avoided? Asher suggests a "photographic test" in addition to basal metabolic rate and cholesterol estimation. "Take a good photograph; then, give thyroid for a month or more and take another photograph. Change between the two photographs clearly confirms the diagnosis."

The most important criterion of diagnosis depends on clinicians becoming increasingly aware of the condition. Medical students should be trained not only with theoretic knowledge but with actual clinical cases of myxedema or with their photographs. The importance of the endocrine factor should be stressed while especially considering the etiology of anemia, psychosis, pericardial effusion, cardiac enlargement of unknown origin, and gynecologic disturbances.

SUMMARY

The cases of 2 patients with myxedema hearts are reported and a brief review of the recent literature is included.

Attention is called to the fact that myxedema may evade diagnosis by masquerading as other medical, gynecologic, or mental disorders.

Emphasis is placed on the importance of increased clinical awareness about the condition.

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A Thirty-Six Year Study of Diseases of the Chest on a University Campus

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TABLE 1

ENTERING STUDENTS AND TOTAL ENROLLMENT
MINNEAPOLIS AND ST. PAUL CAMPUSES

Academic year	Number of entering students (except graduate school)	Total enrollment (including graduate school)
1920-21	2,540	8,657
1921-22	2,493	8,983
1922-23	2,733	9,846
1923-24	2,857	10,034
1924-25	3,063	10,619
1925-26	3,316	11,447
1926-27	3,383	12,232
1927-28	3,424	12,552
1928-29	3,674	13,146
1929-30	3,721	13,419
1930-31	3,892	13,864
1931-32	3,653	13,992
1932-33	3,277	13,225
1933-34	3,469	13,108
1934-35	4,162	14,022
1935-36	4,645	15,328
1936-37	4,552	16,277
1937-38	4,287	16,634
1938-39	4,381	17,250
1939-40	4,599	17,526
1940-41	4,321	17,383
1941-42	4,185	15,669
1942-43	4,120	13,870
1943-44	2,969	9,871
1944-45	3,857	10,896
1945-46	8,552	22,703
1946-47	10,007	32,448
1947-48	6,250	30,307
1948-49	5,844	28,087
1949-50	5,720	26,009
1950-51	5,093	22,838
1951-52	4,779	19,437
1952-53	5,440	20,004
1953-54	5,509	20,424
1954-55	6,254	22,136
1955-56	7,299	24,913
Totals	162,320	

A CLINIC for diagnosis and treatment of tuberculosis and other diseases of the chest was established at the University of Minnesota Students' Health Service in the fall of 1920. This clinic has been in continuous operation for one or two hours each day during every school year since that time. Moreover, students who were on special forms of treatment and had no family physician received regular care during vacations.

The clinic was established when Dr. John Sundwall was director of the Students' Health Service. When he was called to the University of Michigan in 1921, Dr. Diehl became director and continued in that capacity until 1935, when he was appointed dean of Medical Sciences in this school. Dr. Boynton has since been director of the Students' Health Service.

Table 1 shows the number of students entering school each year on the Minneapolis and St. Paul campuses from 1920 through the school year 1955-1956.

The chest clinic has been limited to students and personnel referred by members of the medical staff and those who personally made requests for examinations and treatments. At first, our activities included all diseases and conditions of the chest except those of the cardiovascular system. Later, a special clinic on allergy was established to which cases of asthma and other allergic conditions, such as pollinosis, have been referred.

Since this clinic was established, 7,640 students and faculty members have been examined for chest conditions. Many were re-examined numerous times and treatment administered as indicated.

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An important activity of those associated with this clinic has been seeking information in the literature and by attending local, national, and international meetings where speakers presented their experiences in administration as well as new information on diagnosis, treatment, and prevention of the various diseases of the chest. An early policy which is still in effect provides for assembling and analyzing data from the clinic itself for publication. This was done not only for our own information, which would lead to the improvement of our work, but also so that our experiences could be passed on to others for any benefit they might derive from both our errors and accomplishments.

Since 1920, entering students have had routine physical examinations. In 1929, fluoroscopic inspection of chests was added as a routine procedure but was replaced by photofluorography in 1946. These procedures served to screen out those who had gross lesions of such consistency and locations as to cast visible shadows. In 1928, the tuberculin test became a part of the routine entrance examination,¹ and, since 1930, x-ray film inspection of the chests of reactors has also been routine.

CLINIC PROCEDURES AND FINDINGS

Among the 7,640 students and personnel members examined in the chest clinic, many showed no evidence of clinical disease. Others had residuals of acute inflammatory conditions of the bronchi and lungs which had persisted longer than usual. These and many other transitory and mild conditions are omitted from this presentation. During these thirty-six years we have seen practically every chest disease that develops in persons of university age and many that develop in older people among the University personnel. Space permits only a brief discussion of some of the more common nontuberculous conditions.

BRONCHIECTASIS

Eighty-six persons with bronchiectasis have been seen in our clinic. In the earlier years, bronchography was not often employed, and diagnoses were made largely from history and physical examination, including posteroanterior films of the chest. Later, careful mapping of the various lobes and their segments became possible, so that location and extent of the condition could be at least roughly determined.

In the 1920's, treatment consisted mainly of postural drainage and palliative medication. Nothing offered hope for complete recovery until resectional surgery became possible. Although bronchiectasis had been treated surgically

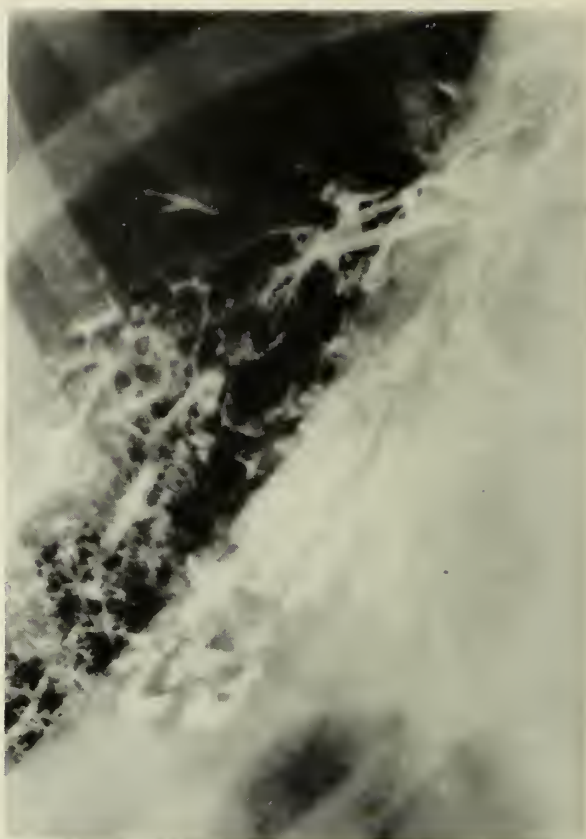


Fig. 1. From a bronchogram taken July 1948 of the left lower lung field of a 21-year-old woman. Note enlarged bronchi. She had pneumonia when 2 years old and has had cough and yellow and green sputum since. Lower lobe of left lung and the lingula were removed in December 1948. She has since had no symptom of bronchiectasis.

in this area for some time, it was first performed on one of our students on June 23, 1945. Since that time, surgery has been recommended for all suitable cases (figure 1). In the last eleven years, we have seen only 19 cases of bronchiectasis, while we noted 67 from 1920 through 1944. The decrease in the number of cases may be the result of better control of pulmonary and bronchial infections by antimicrobial drugs.

PULMONARY CYSTIC DISEASE

We have recognized pulmonary cysts in 8 students. Cysts are often confused with spontaneous pneumothorax and pulmonary cavities. In fact, our first definitely diagnosed case in 1936 was at first thought to be simple spontaneous pneumothorax. Later, bilateral pulmonary cystic disease was diagnosed. Safe pulmonary surgery was not available in time in the patient's locality, and the condition progressed to the vanishing lung stage (figure 2). The 4 cysts we have seen since 1945 have been promptly referred to the chest surgeon.



Fig. 2. Made from roentgenogram taken November 1953 of chest of a 38-year-old man. Note mammoth cysts in both sides of upper chest with vanishing lungs below. At 21 years of age, a small spontaneous pneumothorax on the right side was diagnosed. Later, bilateral upper lung field cystic disease was evident. From 1949 to 1953, cysts apparently had not increased in size. He was able to do sedentary work.

EMPHYSEMA

Areas of localized emphysema always lead us to suspect partial bronchial obstruction with check valves. Such cases have been promptly referred to the bronchoscopist for inspection of the bronchial tree with bronchial washings and biopsy material when indicated.

Chronic hypertrophic emphysema has been observed only a few times among our students. Since this condition is irreversible, it is exceedingly serious in a young person (figure 3). Most of the cases we have seen here and elsewhere have had frequent and prolonged lower respiratory infections or asthmatic attacks with wheezing between the episodes. With improved methods of managing such infections and allergic conditions, it may now be possible to reduce the incidence of chronic hypertrophic emphysema.

SPONTANEOUS PNEUMOTHORAX

We have seen 98 persons in this clinic with simple spontaneous pneumothorax, and 3 with traumatic pneumothorax. These cases have been reported elsewhere with reference to diagnosis and treatment.²

We have issued two important warnings to

students who have had spontaneous pneumothorax. One pertains to subsequent attacks which might result in tension. Therefore, the patients were advised that a physician should be contacted promptly with the earliest appearance of shortness of breath. The situation is easily relieved but, if neglected, can be fatal in a short time. Second, patients were warned of the altitude risk, since 3,000 cc. of air in the pleural cavity at sea level assumes the volume of 3,720 cc. at 1 mile above sea level. At 18,000 ft., the volume of air is doubled, and at 34,000 ft., quadrupled.

Small, simple, spontaneous pneumothoraces or even larger ones probably are far more prevalent at college and university age than is generally recognized. Even if initial symptoms are severe but are of short duration, a physician may not be consulted. On the other hand, if a physician is seen, the condition may be overlooked unless adequate examination is made.

DIAPHRAGMATIC ADHESIONS

Diaphragmatic adhesions, ranging from small pick-up or tenting types to complete obliteration of costophrenic sinus and evidence of thick-



Fig. 3. From a roentgenogram made October 1954 of the chest of a 20-year-old woman. Note evidence of extensive emphysema with low position of diaphragm. Diaphragmatic excursion extremely limited on fluoroscopic inspection. She had had asthma since early childhood, but she was allergic to so many substances that it had never been satisfactorily controlled.

ened pleura in the entire area, were observed in 545 individuals who presented no other evidence of chest abnormality. On a single posteroanterior x-ray film, it is not always possible to differentiate between pleural effusion and obliteration caused by adhesions and thickening of the pleura. For example, we have had x-ray reports of pleural adhesions and a year later, the same persons have been reported to have pleural effusion, but the shadows were identical for the two years. It is important to differentiate between adhesions and fluid, for the latter may indicate a serious cardiac, pleural, or pulmonary condition. Therefore, when one is in doubt, a film should be made with the patient in the lateral decubitus position. Fluoroscopy is also helpful. Resort to attempted aspiration may be necessary.

Recently developed empyema, which was fairly common among students in the 1920's, has become rare. In fact, we have not had a case in this clinic in the past fifteen years. We believe this rare incidence is due for the most part to the management of acute respiratory infections, particularly pneumonia, and administration of antimicrobial drugs.

SARCOIDOSIS

In 19 cases with enlarged hilum shadows or parenchymal infiltrations (figure 4), sarcoidosis has been suspected after efforts to rule out other conditions. Although peripheral lymph nodes have been sought for biopsy, roentgen inspection of the long bones of the hands and feet and care-

ful examinations of the eyes have been made, and the Kviem test has been done in some cases, rarely has sarcoidosis been finally diagnosed. Biopsy of scalene lymph nodes, pulmonary tissue, and mediastinal nodes has been recommended and carried out in a few cases (figure 4). The diagnosis is made only by histologic characteristics of lesions. Sarcoidosis remains the "mystery disease" with unknown etiology.

FUNGAL INFECTIONS

When Palmer³ conducted a nationwide study among student nurses in 1945, and found that 4.1 per cent of the students in Minneapolis and St. Paul hospitals reacted to histoplasmin, and that in some parts of the country there was a closer correlation between sensitivity to histoplasmin or coccidioidin and demonstrable calcific deposits than there was between tuberculin sensitivity and such deposits, we began administering histoplasmin and coccidioidin tests to some of our students who did not react to tuberculin but presented evidence of calcification. During the school year 1947-1948, while conducting a survey among our men students in an attempt to determine the effects of military service on the incidence of primary tuberculosis, fungal antigen tests were given simultaneously with tuberculin. Among the 12,099 who received the triple fungal antigens — blastomycin, histoplasmin, and coccidioidin — 9.7 per cent reacted. When these students then received individual fungal antigens, 8.8 per cent reacted to histoplasmin and 1.3 per cent to coccidioidin.⁴

From 1948 to 1954, 595 students were referred to our clinic only because calcium deposits were evident on routine entrance chest x-ray film inspections. Of this number, 259 reacted to tuberculin, 240 to histoplasmin, 3 to both histoplasmin and tuberculin, 5 only to coccidioidin, and 1 to both histoplasmin and coccidioidin. Sixty-four failed to react to both tuberculin and histoplasmin.

Among the 240 who presented calcification and reacted only to histoplasmin were 27 who were first seen when they showed evidence of inflammatory pulmonary processes interpreted as primary histoplasmosis infiltrates. In some, calcification was not visualized on first examination but later became apparent. In others, small deposits, singly or stippled, were seen within the shadow of the inflammatory process on first examination. In all such instances, inflammation gradually disappeared, leaving in some only sharply outlined densities interpreted as calcific deposits. None of these 27 patients revealed a history of past or present symptoms. They had



Fig. 4. From a roentgenogram taken November 1954 of the chest of a 21-year-old woman. Note evidence of extensive bilateral disease. Histologic diagnosis of sarcoidosis was made about three years before, and ACTH was administered. She improved temporarily, but now has severe cough and dyspnea.

no cough or expectoration, and organisms were not sought. Neither was complement fixation studied. However, it is now recommended that histoplasmin reactors with inflammatory pulmonary processes be more completely documented.

X-ray readings can be extremely misleading and harmful to the patient when roentgenologists attach an etiologic diagnosis which becomes a part of the individual's permanent record. Among the 240 with evidence of calcific deposits who did not react to tuberculin but were reactors to histoplasmin, x-ray reports indicated the presence of primary tuberculosis complexes in 84, Ghon tubercles in 27, old tuberculosis in 19, tuberculosis or histoplasmosis in 12, and old histoplasmosis in 2. An ideal report, namely, a description of location and size of calcific deposits, appeared in only 96. Never should the clinician demand or the roentgenologist volunteer the impossible. Dense, shadow-casting lesions interpreted as calcific deposits should be described as such with no etiologic implication.

Among 64 students with evidence of calcific deposits who reacted to neither tuberculin nor histoplasmin, x-ray readings showed primary tuberculosis complexes in 24, Ghon tubercle in 1, old histoplasmosis in 1, and tuberculosis or histoplasmosis in 5. In the remaining 33, only location and extent of calcium deposits were described.

At first in our clinic, we tested with histoplasmin mainly those with calcific deposits who had resided in such states as Iowa, Illinois, and Ohio. However, outbreaks have since been reported in Minnesota by Rutledge⁵ and Smith and Raetz.⁶ An appreciable number of clinical cases, not all of whom died, have been diagnosed during the last few years. Those who have histoplasmosis in calcified form often inquire about prognosis. Although we have recognized no clinical lesion among our students, we have been unable to give them a definite answer but have advised them to be examined periodically while in school and subsequently. Furcolow and Brasher⁷ found that 2.2 per cent of the patients in a tuberculosis sanatorium had active chronic histoplasmosis, and another 5.3 per cent had probable histoplasmosis. Some of them had calcific deposits suggesting that chronic clinical lesions were of the reinfection type. It still is not known whether reinfections are of exogenous or endogenous origin.

We have had 7 students with demonstrable parenchymal *coccidioidomycosis* lesions, some of which contained cavities. All but 1 had been diagnosed elsewhere before entering this university. Only 2 became clinical cases while in school and were treated surgically (figure 5).



Fig. 5. From a roentgenogram taken December 1955 of the chest of a 30-year-old man. Note evidence of disease in apex of left lung with cavitation at level of first anterior interspace. First symptom was pulmonary hemorrhage in October 1955. All diagnostic procedures failed until diseased segment was resected and mycologist recovered *Coccidioides immitis*.

OTHER CONDITIONS

Some of the nontuberculous conditions that have occurred rarely are teratoma, lymphosarcoma, bronchial adenoma, pulmonary abscess, Hodgkin's disease, and pulmonary fibrosis of undetermined etiology.

TUBERCULOSIS

The first few years of operation of this clinic permitted observations which not only revealed the magnitude of the clinical tuberculosis problem on the campus, but also led to adoption of methods for its control. These years brought us in contact with student patients who left lasting impressions upon our minds. For example, in 1920, a young woman, a freshman in the school of medicine, reported because of profuse pulmonary hemorrhage a few hours before. She had contagious pulmonary tuberculosis which was previously unsuspected. Although she recovered

after a long period of treatment, she never returned to school. During the same fall, a young man reported because of a severe cough. Conventional physical examination revealed no abnormal sign, and bronchitis was diagnosed. The cough did not abate and when he returned one month later, posttussic rales were heard, x-ray inspection revealed extensive disease, and tubercle bacilli were recovered from the sputum.

Although we were diagnosing cases of tuberculosis frequently, we believed there were probably twice as many cases on the campus as we saw, since 50 per cent of our students lived in or near Minneapolis and St. Paul, and most of them reported to private physicians for their illnesses. It was not unusual to diagnose tuberculosis in students and later find that they had roomed with students, of whom we had no previous knowledge, who had contagious disease.

Students often reported with such advanced disease that there was no hope for recovery. In the spring of 1924, a senior in the School of Medicine was so ill when he first made an appointment that he died from tuberculosis three weeks later. Within two years, 4 of his fraternity brothers reported with clinical tuberculosis. Others had such extensive disease that, if they recovered, long periods of treatment were necessary. One young man in whom we diagnosed pulmonary tuberculosis in the fall of 1920 was in sanatoriums for nearly a decade. In the fall of 1930, just ten years to the month after the original diagnosis, he returned to our clinic, having re-entered the University.

Occasionally, we learned of persons who had died from chronic pulmonary tuberculosis within a few months after graduating from the University. However, we had no record of their having been examined at the Students' Health Service while in school.

It became clear that students were entering the University with contagious tuberculosis (figure 6). The disease developed in others, and their cases became contagious while in school. We were achieving no success in the control of this disease except to make diagnoses and recommend treatment for those who voluntarily reported.

EVOLUTION OF DIAGNOSTIC METHODS

When our observations began, we were confident that symptoms were the early manifestations of all clinical cases of tuberculosis. The solution seemed to be in teaching students about tuberculosis so they would report when symptoms appeared. However, further observation revealed that chronic pulmonary lesions can



Fig. 6. From a roentgenogram of the chest of a student who entered summer school July 1, 1929. Note extensive pulmonary disease. This was before entrance tuberculin testing and films of chests of reactors were required. One day after registration, he had profuse pulmonary hemorrhage, and tubercle bacilli were found in his sputum. He had no other significant symptom. Only the hemorrhage called attention to the disease, thus preventing wide dissemination of tubercle bacilli on the campus.

be detected early in their evolution and may extend to advanced stages without producing symptoms. In fact, symptoms were found to be a late manifestation of disease in the majority of cases.

We also believed the previous theory that whenever clinical pulmonary tuberculosis was present, abnormal *physical signs* could be elicited. However, as numerous progressive lesions were discovered which had exhibited no sign, it was obvious that the conventional physical examination of the chest is often unreliable.

In the early 1920's, the x-ray film was looked upon somewhat as a luxury to be recommended only when symptoms or abnormal physical signs were present. However, observation revealed that the x-ray film is often a much finer screen than either symptoms or physical signs. In fact, it was shown that evolving chronic lesions can be found by the x-ray shadows they cast months and often years before any other evidence appears, and, thus, we came to realize that no examination of the chest is complete without x-ray film inspection.

From 1921 on, one of us conducted a tuberculosis project under the direction of the Minneapolis Department of Health and the School Board.⁸ More than 19,000 children were examined annually from birth through high school and re-examined periodically. These were complete examinations and included the *tuberculin test* and stereoscopic x-ray films of the chest of each child. Within a few years, an analysis of

the data revealed that no tuberculosis had been found in a nonreactor to tuberculin. Thus, the futility of making x-ray film inspection of the chests of nonreactors was obvious.

As periodic x-ray film inspections of the chests were made of tuberculin reactors, we saw in some whose initial films were clear, small lesions appear and slowly evolve to gross proportions in the absence of symptoms, abnormal physical signs, and positive bacteriology. This occurred so often that periodic x-ray film inspection of the chests of all tuberculin reactors appeared to be an excellent procedure. We also saw many apparently healthy young adults who, on first examination, presented shadow-casting lesions that proved to be tuberculous but showed no other evidence of disease except the tuberculin reaction. Therefore, x-ray film inspection of the chest was proved an indispensable part of every examination of tuberculin reactors.

Thus, it had been observed that in older children and University students, chronic pulmonary tuberculous lesions usually pass through a long, silent period, ranging from months to years after they are detectable by x-ray shadows, before symptoms, abnormal physical signs, and positive bacteriology are in evidence. This became so evident early that in 1922 we offered a mass x-ray film survey to the students of a large high school.

Since 1920, students entering the University of Minnesota have been given complete conventional physical examinations. However, it was not unusual to see individuals whose disease had been missed by the entrance examination present symptoms, such as hemorrhage, which was caused by extensive chronic pulmonary tuberculosis during the freshman year.

At that time and for a few years thereafter, the addition of chest x-ray film inspection to the entrance examination was out of the question for the following reasons: (1) the majority of physicians still believed that all tuberculosis could be found by symptoms and physical signs, (2) cost of x-ray films was prohibitive in such large numbers, and (3) our x-ray department was not equipped for such a volume of work.

In the early 1920's, the tuberculin test was used little except for those who showed evidence of gross disease or were ill. We were laboring under the old teaching that nearly everyone in early adult life had been infected with tubercle bacilli and, therefore, would react to this test, despite the fact that in 1924 Slater⁹ had reported only approximately 10 per cent of rural school children had been infected with tubercle bacilli as manifested by reaction to tuberculin.

TUBERCULIN TEST FOR ALL ENTERING STUDENTS

To test the validity of former teachings, the tuberculin test was administered by Pirquet's epidermal method to our entering students in the fall of 1928. Only about 1 in 3 reacted. When published, this report¹ was questioned by some physicians on the ground that the Mantoux intracutaneous method of administration is more accurate and would have given a higher yield. In the fall of 1929, the entering students received tuberculin by this method but with a slightly lower percentage of reactors than in 1928. This meant that the incidence of infection was so low that our subsequent attack should be directed to the tubercle bacillus rather than just toward the damage it had done.

Ghon¹⁰ had already demonstrated that lesions can usually be found at necropsy in persons who had no evidence of tuberculosis during life except the tuberculin reaction. It was later shown that many such lesions contain living tubercle bacilli. Therefore, a tuberculin reaction demonstrates the presence of tubercle bacilli in the individual's body as certainly as though these organisms were seen under the microscope or grown in culture medium or in experimental animals.

It was also known that the tuberculin test detects the presence of tuberculosis after an invasion of tubercle bacilli far earlier than any other phase of examination. Usually, within three to seven weeks, the tissues, including the skin, are so sensitized to tuberculo-protein that they react characteristically to tuberculin. In the majority of cases, this occurs long before x-ray inspection of the chest, symptoms, and conventional physical signs are of diagnostic aid.

It was observed that only in persons who are invaded with tubercle bacilli and become tuberculin reactors may clinical tuberculous lesions later develop. Therefore, we recognized the tuberculin test as our most effective weapon against the tubercle bacillus. It not only told us in whose bodies they had found refuge, but that those persons should be promptly examined for clinical disease, and, if this was not found, they should be periodically examined for disease that might subsequently evolve.

In 1929, fluoroscopic inspection of the chest became a part of examinations of entering students. This was recognized as a coarse screen, but, when abnormalities were seen, further examination was indicated, including x-ray films. This immediately resulted in finding between 3 and 4 times as many cases of tuberculosis as had been detected by only the conventional physical examination.

Also in 1929, it was decided to examine at least 2 classes of students from the schools of medicine, nursing, and education each year they were in school. In addition to the usual physical examination, this included the tuberculin test and fluoroscopic and x-ray film inspection of the chest. This study was most revealing.

So much evidence had accrued pertaining to the value of x-ray film inspection of the chest that Dr. Diehl, director of the Students' Health Service, was thoroughly convinced that it should become a requirement for every entering student who reacted to tuberculin. The only remaining deterrent was the cost of such a procedure. We were fortunate that the president of the University, Lotus D. Coffman, had an unusual interest in tuberculosis. He approved this procedure on a trial basis and stated that if it accomplished as much as previous evidence indicated, it would become a part of the routine examination of entering students. Therefore, in the fall of 1931, all entering students who reacted to tuberculin had chest x-ray film inspection. In that class, 22 were found to have clinically important tuberculous pulmonary infiltrations. One, who had been a high school athlete the year before and had no symptom on admission, had far advanced contagious tuberculosis. Five had moderately advanced lesions, and the remainder had minimal lesions. Since that time, students who reacted to tuberculin on admission have had chest x-ray film inspection.

Fluoroscopic inspection of the chests of all entering students, which was begun in 1929 (photofluorograms since 1946), was continued. This was because tuberculin testing is time-consuming, and the fluoroscope occasionally revealed evidence of extensive disease in individuals who should immediately be examined. It was also continued because other gross abnormalities were promptly detected.

In 1932, Dr. Diehl wrote concerning the beginning of this program as follows: "It should be possible, by extending such a program to the entire student body or to any other group of individuals, to diagnose all tuberculosis in its truly curable stage and to prevent individuals in the group from transmitting the infection to their associates."¹¹

TUBERCULIN REACTORS CONSTITUTE TUBERCULOSIS PROBLEM

Approximately 33 per cent of the students entering the University of Minnesota in 1928 were already harboring tubercle bacilli.¹ Over succeeding years, this percentage decreased until

1945, when only 6.4 per cent reacted. The next year a large number of entering students had recently returned from military service, many of whom had been abroad in places where little has been done to control tuberculosis. Moreover, they were older than former entering students. With this influx, 19.3 per cent of all entering students reacted in the school year 1946-1947. As the number of war veterans decreased, there was a corresponding reduction of tuberculin reactors among entering students. However, this percentage has since fluctuated, probably because of such factors as the Korean War and other military services, as well as increase in foreign students.¹² Obviously, our problem lay in those who reacted to tuberculin on entrance to school and those who became reactors while in school.

MOST SERIOUS PROBLEM IN SCHOOLS OF NURSING AND MEDICINE

Although we had known of students of nursing and medicine who had become ill from tuberculosis and some who had died before the Students' Health Service was organized, the problem in these professional schools became more obvious soon after the chest clinic was established. While these schools constituted a small segment of the University's student body, they contributed a major portion of those reporting with clinical tuberculosis.

Tuberculin testing of entering students in these schools quickly screened out those who had not previously been infected with tubercle bacilli, and periodic testing of these individuals promptly identified those who became infected while in school. This revealed what was happening far more accurately than the number of students who fell ill from tuberculosis each year. For example, it was found that the increment of infected students in the college of education was about 1 per cent per year, while that in the schools of nursing and medicine was many times greater, particularly after the sophomore year.^{13,14}

The incidence of clinical tuberculosis in schools of nursing and medicine was definitely higher than in the school of education for the simple reason that tubercle bacilli had invaded the bodies of a much higher percentage in the former groups.

An unintentional experiment had been set up for us which was equal to any experimental animal study that could have been devised. Both our nursing and medical students were being sent to a tuberculosis sanatorium for instruction where they had intimate contact with

numerous contagious cases. Moreover, they were working in general hospitals which did not have tuberculosis services but were admitting patients for treatment of accurately diagnosed conditions, such as diabetes and fractures, some of whom had coexisting but unsuspected tuberculosis.

In the late 1920's, 3 other general hospitals operating schools of nursing were chosen on the basis of differing tuberculosis situations in order to round out our study on tuberculosis among students of nursing.¹³ Two of these additional schools had no tuberculosis service for their students, but one added such a service in 1937 within the walls of its hospital. The third had a tuberculosis service with about 70 beds in a separate building. Thus, different and varying situations afforded numerous study opportunities. In each of these schools, periodic examinations of students, including tuberculin testing and x-ray films of the chest, were made from the time they entered until graduation, just as was done with University students.

Periodic testing of students who were uninfected before entering school uncovered important situations. For example, many of those returning from a sanatorium service had become reactors. This was also true of those returning from some services in general hospitals. It was, therefore, possible to pinpoint the institutions and departments responsible for transmitting tubercle bacilli to students.

This experiment also gave us an opportunity to study the evolution of tuberculosis in the human body. Periodic examinations of those who had become infected on various services revealed that a few soon had tuberculous pleurisy with effusion. In a small percentage, primary pulmonary infiltrates were in evidence about the time sensitivity could first be detected by the tuberculin test.¹⁵

Continued observation of tuberculin converters, whether or not pleurisy with effusion had intervened or primary infiltrates had cast visible x-ray shadows, revealed that some of them later presented pulmonary and extrathoracic tuberculous clinical lesions. Such lesions did not all appear within one or two years after invasions with tubercle bacilli had occurred but were spread over many years.

There has long been an opinion that primary tuberculous infections are much more serious when acquired in adulthood than in childhood. This has not been substantiated by our observations. Students who became infected while in school and after graduation have tolerated the infection in the same manner as those infected as children. We have seen no difference in the

severity or extent of subsequent clinical lesions. Moreover, they have responded to treatment in the same way as lesions which developed among those who had been infected in childhood.

Some believe that little benefit is derived from protecting students of nursing and medicine against invasions with tubercle bacilli, since nearly all of them become infected soon after graduation. Recent surveys of graduates of our schools of nursing and medicine reveal that large numbers have remained uninfected.¹⁶⁻¹⁹

When it became obvious that many students were becoming infected with tubercle bacilli from patients in general hospitals who had unsuspected tuberculosis, Dr. Diehl, on becoming dean of the medical sciences in 1935, arranged to have all patients examined for tuberculosis on admission to the University Hospital. He also provided for examination of hospital personnel, both before employment and semiannually.²⁰

Since 1921, the Mayo Clinic has made routine x-ray film inspections of the chests of patient admissions. This practice has also applied to those admitted to Methodist and St. Mary's hospitals in Rochester, Minnesota. Kinsella demonstrated the value of x-ray film inspections of chests of admissions to St. Mary's Hospital, St. Louis, in 1925; Mills and Stewart showed the value of tuberculin testing and x-ray films of chests of admission reactors at Swedish Hospital, Minneapolis, in 1933; in 1936, Hodges employed x-ray film chest inspection of hospital admissions to good advantage at the University of Michigan; and Oatway conducted an excellent program at the Wisconsin General Hospital. However, this program at the University of Minnesota Hospital was the first project that has remained in continuous operation and has included tuberculin testing and x-ray film inspection of chests of both patient admissions and personnel. A similar program has now been adopted by all general hospitals in Minneapolis and St. Paul. In fact, it is currently operating throughout this state in about 80 per cent of all hospital admissions.

Early in the 1930's, a *contagious disease technic* was instituted on a small tuberculosis service at the University Hospital. A little later this technic was adopted at the Minneapolis General Hospital where many of our students of nursing and medicine were taught. It is now employed in practically all general hospitals in this vicinity.

For several years, all students of medicine spent two weeks in residence in a sanatorium in intimate contact with many patients with contagious diseases. However, testing with tuberculin before and after this service revealed such a

large number of converters that the students protested, and this service was discontinued in 1936. Later, a tuberculosis service operated under strict contagious disease technic was substituted.

Students in the University school of nursing had long spent six weeks or more in residence at a sanatorium. However, since 1940, only tuberculin reactors have had this long service in contact with contagious cases. Nonreactors have spent two weeks in the sanatorium working only with noncontagious cases.

The effectiveness of these methods of controlling tuberculosis among students of nursing and medicine has been phenomenal. For example, in the school of medicine, a 1941 survey of the classes graduating from 1919 through 1932 revealed that demonstrable tuberculous lesions had developed in 92 or 7.1 per cent while in school or after graduation. 11 of whom had died from tuberculosis.¹⁴ A recent survey¹⁹ showed that in the past fourteen years, a clinical lesion large enough to be detected by its x-ray shadow developed in only 1 student, and he had been infected before entering the school of medicine.

In one school of nursing, from 12 to 19 per cent of the students had demonstrable tuberculous lesions before graduation prior to the institution of our program.¹⁶ Since this program has been well established, clinical disease has developed in only 4 students, all of whom had been infected before entering school.¹⁸

Other schools and colleges on the campus also presented tuberculosis problems, but the number of clinical cases was far less than in the schools of nursing and medicine. However, the procedures employed in these professional schools were applicable to all.²¹

In order to determine what differences existed in the tuberculosis problem among students and graduates in the schools of law and medicine, a survey of the law school was reported in 1943.²² Of the 1,209 graduates in the classes of 1919 to 1936 inclusive, 941 or 83.64 per cent were traced. Clinical tuberculosis had developed in only 15 while in school or subsequently, 8 of whom had died.

OTHER PREVENTIVE MEASURES CONSIDERED

We have tried to protect students by managing tuberculosis as a contagious disease. On numerous occasions, pressure has been exerted for the use of one or more of the many agents proposed for immunization. For this purpose, bacille Calmette-Guérin (BCG) was most often recommended. Since a mild or severe attack of tuberculosis has never left the human body dependably immunized, there appeared no premise

for attempting to produce immunity artificially. At no time was incontrovertible evidence adduced of the efficacy of so-called immunizing agents. Moreover, we were fearful of living tubercle bacilli, regardless of a low degree of virulence at the time, because of mutation possibly occurring in culture and the human body.²³

If BCG had been adopted and administered to all entering uninfected students, they would have been promptly converted to tuberculin reactors, and, thus, our most potent weapon, the tuberculin test, would have been rendered useless. This test, more than any other method we have employed, has been responsible for the accomplishments in our tuberculosis control program. At all times, it has determined the magnitude of our problem. It has led to the diagnosis of tuberculosis earlier and more accurately than any other phase of the examination. It has been our best epidemiologic agent. It is the only accurate measure of the effectiveness of the tuberculosis control program. It selected those who should be examined periodically for the appearance of clinical disease and has determined responsibility in cases that came to litigation. With the advent of antituberculosis drugs, the tuberculin test may now be the only criterion for the initiation and termination of treatment if tuberculosis is to be cured in the strict sense of the word.

Our fear of introducing living tubercle bacilli into human bodies regardless of the low degree of virulence has been justified. In recent years, BCG, which had been reduced to such low virulence that it would not produce tubercles in animal tissue in 1920, apparently has undergone mutation to such a degree that these cultures no longer are composed of a single bacterial form but contain multiple bacterial forms, some of which are definitely invasive for animal tissues.²⁴⁻²⁸ Apparently, these have been the invasive forms that have resulted in destructive and fatal disease in mice on a deficient diet,²⁴ silicotic guinea pigs,²⁵ normal golden hamsters, and ground squirrels. Evidently, these are the same forms that have caused so much clinical disease by way of abscesses and ulcers at the site of administration and regional lymph nodes, requiring antimicrobial drugs and often surgery, as well as cases of lupus vulgaris. Apparently, these mutants have caused progressive and fatal tuberculosis in children and young adults.²⁹

PERSONNEL

It has been difficult in many colleges and universities to procure cooperation in extending the tuberculosis control program to personnel. This

is unfortunate because of the well-known fact that more clinical and contagious tuberculosis develops among older persons than among those of student age.

On this campus, cases of contagious tuberculosis were known to exist among faculty members. Even some students in whom tuberculosis developed maintained that they had contracted it from their teachers. All attempts to control this situation failed until the spring of 1938, when Dr. Boynton succeeded in having the Board of Regents make a rule requiring all new nonacademic employees in the University to have a physical examination before employment. Physical examinations of all new members of the academic staff and those promoted to positions implying tenure have been required since the spring of 1941. The Health Service has conducted these examinations in as thorough a manner as the student examinations. Although all attempts to obtain a blanket order for examinations of faculty members and other employees had failed, this compulsory examination served as an entering wedge and will ultimately include the personnel of the entire school.

STUDENTS FROM OTHER COUNTRIES

During the past few years, we have had many foreign students, mostly for graduate work, a high percentage of whom were tuberculin reactors on admission. For example, among the 355 who entered during the 1953-1954 school year, 68.7 per cent reacted to tuberculin, whereas among the entire entering student body of 5,509, 15.4 per cent reacted.

Wherever there is a high incidence of tuberculin reactors there is a correspondingly high morbidity rate. During the past six years, 25 students have had diagnoses of clinical pulmonary tuberculosis first made on entrance or while in school, of whom 15 or 60 per cent were from other countries, although they constituted less than 3 per cent of the student body. While these students were cleared on the basis of satisfactory x-ray films of their chests before leaving their native countries, the x-ray screen was too coarse. On arrival here, they had at least microscopic lesions, as manifested by the tuberculin reaction, which evolved to such size and consistency that they cast x-ray shadows. Probably, such evolution would have occurred if they had remained in their native countries.

TUBERCULOSIS AS SEEN IN CHEST CLINIC

When the limitations of the x-ray film became apparent and it was realized that only gross lesions with adequate consistency cast demonstra-

ble shadows, the tuberculin test was recognized as the most important diagnostic agent. This alone justifies the diagnosis of primary tuberculosis. Although shadows of lesions seen on x-ray films are not pathognomonic, they roughly locate areas of disease, after which etiology must be determined by more refined methods.

Recovery of tubercle bacilli has been considered the last court of appeal. When acid-fast bacilli were found in the sputum or gastric or bronchial washings, their pathogenicity had to be determined by culture or, preferably, by animal inoculation.

The tuberculin reactor who presents an x-ray shadow-casting lesion in an apex of a lung, from which tubercle bacilli are not recovered on repeated trials by all methods, is the bane of the diagnostician. Although, until recently, roentgenologists almost universally reported such shadow-casting lesions as tuberculous, clinicians knew full well from postmortem experience that many of them were nontuberculous. Recent advances in chest surgery have made pulmonary biopsy possible. We have occasionally found this procedure necessary.

Diagnosis of the activity of tuberculous pulmonary lesions may be exceedingly difficult. One cannot always be guided by x-ray shadows. When a shadow-casting lesion is first seen in a person who has not previously been examined, an attempt should never be made to determine activity from the shadow alone. From its shadow, a lesion may appear to be exactly the same year after year and, therefore, be considered well stabilized, even though there is definite activity within the lesion which is not detectable by shadows.

The erythrocyte sedimentation rate has been used in our clinic extensively, but, since it is not specific, one is rarely sure that acceleration is caused by a pulmonary lesion under consideration. However, if an attempt is made to rule out all other possibilities and the rate is still markedly accelerated and persists, it may be accepted as reasonably good evidence that the given lesion is active.

Finding acid-fast bacilli, even if they prove to be tubercle bacilli, in an occasional gastric washing specimen with no other significant evidence of progressive tuberculosis has not received particular emphasis in this clinic. In our epidemiologic work, we have not seen a person with tubercle bacilli in gastric washings only with evidence of infection of others.

Among the 7,640 individuals examined in the clinic since the fall of 1920, the diagnosis of reinfection or clinical type of pulmonary tubercu-

losis was made in 1,063. Probably, some of these diagnoses, particularly those made in the earlier years of this work, were in error, inasmuch as "x-ray diagnoses" were sometimes accepted when tubercle bacilli were not recovered. In more recent years, we have insisted upon more thorough documentation of cases. Even so, we have been guilty occasionally of making presumptive diagnoses of tuberculosis without recovery of tubercle bacilli and without biopsy.

The 1,063 persons on the campus since 1920 with diagnoses of tuberculosis fall into 2 groups. The first group includes those who had clinical disease before entering school. The lesions were well controlled in many of them, while others were still under treatment, including artificial pneumothorax. When this clinic was established and for some years thereafter, we received a sizeable number of students who were war veterans and who had been, or were being, treated by the United States Public Health Service and, later, by the United States Veterans' Bureau. Since World War II, many who have been treated by and are still under observation of the United States Veterans' Administration have been enrolled in this University. Many of these students have been sent to this school on a rehabilitation or re-education basis, and they are still under close medical observation of the Veterans' Administration.

Because tuberculosis is a notoriously relapsing disease, we have felt the responsibility of keeping close check on all students who entered the University after having had clinical tuberculosis, although they apparently had recovered. Tuberculous students under the jurisdiction of Veterans' Administration have been examined in our clinic on admission to school. Thereafter, the Veterans' Administration has supplied us with reports of periodic examinations. Throughout the years, we have had students previously treated in local sanatoriums who have been kept under the supervision of their outpatient departments. In such cases, also, we adopted the policy of requesting periodic reports from the sanatorium outpatient clinic staffs.

Students who have been or are being treated by private physicians are completely examined upon entering school. However, they are ad-

vised to continue seeing their physicians, who are requested to send us reports as indicated.

Before periodic examinations were required of all persons who had clinical tuberculosis prior to entering the University, some catastrophes occurred on the campus, such as reactivation of old lesions or development of new ones which became contagious without our knowledge. Now, when these situations occur, they are usually detected and promptly managed.

In the early years of our work, students in whom we diagnosed tuberculosis often failed to return for disposition as we requested. Inasmuch as their return was on a voluntary basis, no follow-up system was in vogue. This led to students remaining on the campus after they had agreed to report to their private physicians or to be hospitalized. Therefore, it became necessary to develop a rigid follow-up system.

Another difficulty was encountered by students who left school for treatment and later re-registered without the knowledge of the Health Service. Some of these students returned to school after leaving sanatoriums against medical advice and while still contagious. This problem was largely solved by sending a "stop" notice to the registrar's office when the student originally left school. This was attached to the student's registration card and indicated that he was not to reregister before clearing with the Students' Health Service. The importance of keeping all persons who have been infected with tubercle bacilli under observation has been demonstrated many times in this clinic. This is of equal or even greater importance for both professional and nonprofessional personnel.

The second group of students with clinical tuberculosis were those who were first found to have the disease on entrance, or it evolved while they were on the campus. Between 1934 and 1955, there were 218 entering students who had been previously treated for pulmonary tuberculosis. When their disease was originally diagnosed, 85 of the cases were minimal, and 133 were advanced. During the same years, tuberculous lesions were found in 277 students on admission or while they were in school. Of these, 229 were in the minimal stage and 48 were advanced when the disease was first detected.

TO BE CONCLUDED IN MAY



This department of THE JOURNAL-LANCET is devoted to reports on cases in which all the appropriate diagnostic criteria have been employed, the best known treatment administered and the results recorded. It is desired that these case reports be so prepared that they may be read with profit by physicians in general practice, hospital residents and interns and may be of considerable value to junior and senior students of medicine. This department welcomes such reports from individuals or groups of physicians who have suitable cases which they desire to present.

Massive Dilatation of the Left Auricle

Report of Case

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EXTREME DILATATION of the left auricle is an uncommon finding. Since 1901, when Owen and Fenton¹ published what has been thought the first clinical and pathologic description of this condition, there has been little information in the literature and few case reports. In 1930, Burkhardt, Jr.,² reported a case from Bellevue Hospital with pathologic findings, and, in 1936, we added another report of this condition from the same institution.³ As recently as 1953, Sloan and associates⁴ reviewed the literature and added 2 more examples. In addition, they have discussed the anatomy, physical signs, symptoms, radiologic picture, pathology, and probable pathogenesis. They concluded that the diagnosis of massive left auricular enlargement should be suspected if a patient with chronic rheumatic heart disease has symptoms such as dysphagia, cough, or chest pain. Chronic auricular fibrillation is also present. In spite of the greatly enlarged heart in this condition, exercise tolerance is good. Also, systolic pulsation of the right chest wall is frequently visible and palpable, and x-ray findings are typical. They also feel that this condition is more common than the relatively few cases reported would indicate.

The following patient with this condition is a eunuch whom I have observed since 1946.

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CASE REPORT

History and clinical course. The patient was first seen in April 1946, at the age of 30. He consulted a physician because he had a known cardiac condition and wanted supervision. His history dated from September of 1943 when he awoke from sleep with cramps in one of his legs. He remembered going to the window and then fainting. When he awakened in bed, he was being attended by a physician. He stayed in bed for two weeks and then was progressively ambulated. His activity, however, was restricted until May of 1944; but, in September, he resumed his full occupation as an accountant in a large corporation. His wife was told that he had a "heart attack with fibrillation." At this time he was digitalized and had been maintained on $1\frac{1}{2}$ gr. of digitalis twice daily. There were no cardiovascular symptoms after this attack. In July 1944, while lying in bed, he had a sudden feeling of numbness in both arms and experienced difficulty in his speech. This lasted only a few minutes and cleared spontaneously. A second similar episode occurred one month later while he was lying flat on his back. He was then advised by his physician to sleep in a sitting position and has had no recurrence of these symptoms.

The patient remained free of symptoms until 1950 when a febrile illness developed which proved to be subacute bacterial endocarditis. For this condition, he was given 1.5 million units of penicillin every eight hours intramuscularly for a total of twenty-six days. He was carefully followed for the possibility of a recurrence during the following year which did not occur.

Symptoms. At the present time, cardiovascular symptoms are: (1) dyspnea, noted only after walking $1\frac{1}{2}$ miles; two years ago, he could walk 3 miles, but the change in his exercise tolerance has not been striking

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or progressive; (2) precordial pain occurs occasionally for no apparent reason and is of a vague nature and not typically anginal.

He has been more conscious of his heart since the onset of fibrillation. In particular, there has been no orthopnea, paroxysmal dyspnea, or edema. He has noted mild dizziness occasionally but has had no fainting spell, such as occurred at the onset of his illness in 1944. He also has had rather frequent bronchial infections with cough. His endocrinopathic history shows that he has never had a change in voice, which is of female type intonation. His sexual history reveals that he is not able to have sexual intercourse because of his penile size. He has had erections but has never had an ejaculation. He tolerates warm weather better than cold weather and has also noted some dryness of the skin.

He has been self-conscious of his endocrine problem but has made a good adjustment to it. His wife has tolerated the situation very well, and there has never been any stress between them for this reason. He also stated that when people look at him intensely, he feels very uneasy because of his body build.

Past history. At the age of 15, he had a migratory arthralgia involving the knees, elbows, and wrists. He remembered that these joints were tender to the touch, red, and hot. He could hardly get around, but he did not stop working. No physician was consulted at this time. There was no history of sore throat, but he did have occasional nose bleeds. There was no history of chorea.

Family history. One brother died at the age of 42 of thyrocardiac disease. Another brother is eunuchoid. The family history was not otherwise contributory.

Habits. He has used no tobacco and only moderate alcohol. He had eaten a normal, well-balanced diet until four years ago, when he lost 39 lb. on a low-carbohydrate and low-caloric diet.

Physical examination. This examination revealed a young-looking man for his chronologic age, 6 ft. 2 in. tall, weighing 171 lb. with extremities disproportionately much longer than his trunk (figure 1). Very slight kyphosis of the spine was present. Prominent superficial capillaries of the face were noted, but there was no definite malar flush. A small mass the size of a nut was felt in the right retromaxillary angle. The upper part of his chest appeared to be elongated and the lower part widened. The breasts were slightly prominent and resembled an underdeveloped female chest. The radial pulses were unequal and irregular, the rate varying between 70 to 80 per minute. Blood pressure was 110 systolic, 70 diastolic.

Examination of the heart disclosed on palpation a diastolic thrill in the second and third left interspaces on the left. The second pulmonary sound was accentuated. There was a Grade II systolic murmur and a Grade II diastolic rumbling murmur at the apex and a poorly transmitted Grade I systolic murmur at the base in the second intercostal space.

A moderate number of subcrepitant rales were heard only in the right posterior lower chest. The liver was not palpable. No other abdominal findings were seen.

LABORATORY EXAMINATIONS

Clinical pathology. There were no clinical pathologic findings of unusual interest. The blood sugar was slightly elevated, and a trace of glucose in the urine has been present from time to time.

Electrocardiography. The electrocardiogram revealed auricular fibrillation and T-wave abnormality caused by digitalis.

Fluoroscopy and x-ray study. The thorax appeared normal. The pulmonary fields had a diffusely decreased transparency. The parenchyma showed diffused increased bronchovascular markings. The hilar area appeared accentuated and dense bilaterally. The mediastinum was occupied by a large spherical mass the size of a small melon with well-delineated contour. The diaphragms had a moderately decreased motility with normal costophrenic sinuses. The cardiac silhouette indicated a semi-vertical, very large heart. The cavity enlargement, estimated from 1 to 4 plus, was as follows: right auricle, 1 to 2 plus; right ventricle, 1 to 2 plus; left auricle, 4 plus—this is of aneurysmal size and comparable to a small watermelon (figure 2); left ventricle, 2 plus. The aorta was of normal shape. The pulmonary artery was of increased size in its trunk and main branches. The left main bronchus appeared horizontal because of compression of the large left auricle. The esophagus was markedly deviated by the enlarged left auricle (figure 3).

Angiocardiography. Angiocardiographic studies demonstrated the superior vena cava, right auricle, and right ventricle with the right ventricular chamber somewhat enlarged. The pulmonary vasculature is outlined. A huge left auricle is demonstrated with opaque material seen in the left auricle up to thirty seconds. Opacification begins at twelve seconds in the left auricle. Mitral valve calcification is clearly delineated. The left ventricle is slightly opacified and does not appear enlarged.

DISCUSSION

This patient showed many clinical features similar to those seen in previously reported cases. The fact that the left auricle can attain greater dilatation than any other chamber has been emphasized. In this case, as in the majority of cases, history revealed previous rheumatic fever and,



Fig. 1. Physical appearance illustrating eunuchoidism associated with massive dilatation of the left auricle.



Fig. 2 (left). Chest film showing huge dilatation of the left auricle. barium-filled esophagus from the enlarged left auricle.



Fig. 3 (right). Oblique view showing pronounced deviation of

also, the usual findings characteristic of chronic rheumatic carditis and mitral valvulitis. This condition occurred in a man, whereas most reported examples have been in women. This individual was, interestingly enough, eunuchoid. He has never had difficulty in swallowing, a frequently reported symptom. Chest pain was present and, as has been reported by others, it was often of a rather vague nature. The physical signs in his right lower lung, caused by compression of the right lower lung by the enlarged auricle, are a frequent finding. Again, as in all reported examples, and in my previously reported case,³ remarkable exercise tolerance was noted. This has been explained by the theory that there is probably no pulmonary hypertension in these individuals. In one reported cardiac catheterization study, the absence of pulmonary hypertension was proved. More studies of this type will be necessary before this fact is finally determined. This man had an apical systolic and diastolic murmur, characteristic of mitral valvulitis and noted in all reported cases.

Aurical fibrillation was present, and this arrhythmia is a consistent finding with almost every previously recognized example of this condition.

Fluoroscopic examination and x-ray studies were classical.

The angiocardiographic method opacified the huge left auricle and helped differentiate it from a mediastinal or intrathoracic tumor with which it can be easily confused. In my first report,³ it was difficult to determine whether a pleural or pericardial effusion was present, and unnecessary diagnostic needling was done.

The occurrence of subacute bacterial endocarditis with massive dilatation of the left auricle has not been reported and appears to be an unusual complication. However, there is no obvious reason why it should not occur superimposed on a damaged mitral valve.

The finding of this condition in a eunuch appears to be accidental and not related to the endocrinopathy. Further investigation of this relationship seems to be indicated.

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Comments concerning this Section, criticisms, or suggestions for papers will be most welcome. Physicians are cordially invited to submit articles pertaining to pain for consideration. All inquiries and manuscripts should be sent to Dr. John S. Lundy, 102 Second Avenue Southwest, Rochester, Minnesota, or to the Editorial Department, THE JOURNAL-LANCET, 84 South Tenth Street, Minneapolis, Minnesota.

The Dental Pain Mechanism

Part I. Neuroanatomic Characteristics

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DESPITE many recent advances made in dentistry in the restorative and preventive areas, the dental practitioner still finds a large part of his practice intimately associated with some manifestation of oral pain. The objective of this series of studies is twofold: (1) to indicate the effort being made in the field of dentistry toward an understanding of the basic pain mechanism as it is being advanced by the laboratory and the clinical investigator, and (2) to outline briefly some of the sensory characteristics of the trigeminal nerve as it pertains to dental tissues.

While there are many disease entities which may produce oral pain, none causes pain so intense as that following inflammation of the dental pulp, that is, the toothache. Most of the fundamentals of dental pain can be described by using the toothache as the example.

The person who has experienced pain originating from a tooth might well assume that the nerves of the teeth possess extraordinary properties not found in other nerves; similarly, the painful paroxysms associated with severe trigeminal neuralgia may impress one with the strange behavior of a unique pain mechanism.

Historically, it is of interest to note that analgesics were first used in the treatment of toothache. An ancient Babylonian clay tablet which dates back to 2250 B.C. bears a description of the remedy for the pain of dental caries. A cement consisting of henbane seeds (a poison-

ous herb) mixed with a gum mastic was applied to the cavity of the tooth. Even as late as 1772 A.D., the same treatment was in common use.¹ Galen recorded 2 sites of pain, 1 in the tooth and the other in the surrounding tissues. In 1778, John Hunter gave this account relative to dental pain: "In the cavity of the tooth it is well known that there is exquisite sensitivity and it is likewise believed that this is owing to the nerve in that cavity. This nerve would seem to be more sensible than nerves are in common, as we do not observe the same violent effect from any other nerve in the body being exposed either by wound or sore as we do from the exposure from the nerve of a tooth. Perhaps the reason for the intenseness as well as the quickness of the sense of heat and cold in the teeth, may be owing to their communicating these to the nerve sooner than any other part of the body."²

The controversy regarding innervation of the dentin and the manner by which sensation is conducted from the dentin to the pain receptor was increased after development of the compound microscope. One group of workers demonstrated nerve fibers entering the dentin between the dentinal tubules; another group showed fibers terminating within the dentinal tubules; and still others insisted that these results were all artifacts resulting from staining methods, and that the nerve fibers did not enter the dentin at all. These arguments still exist.

There is general agreement that medullated sensory fibers enter the apical foramen of the teeth, lose their medullary sheath as they ap-

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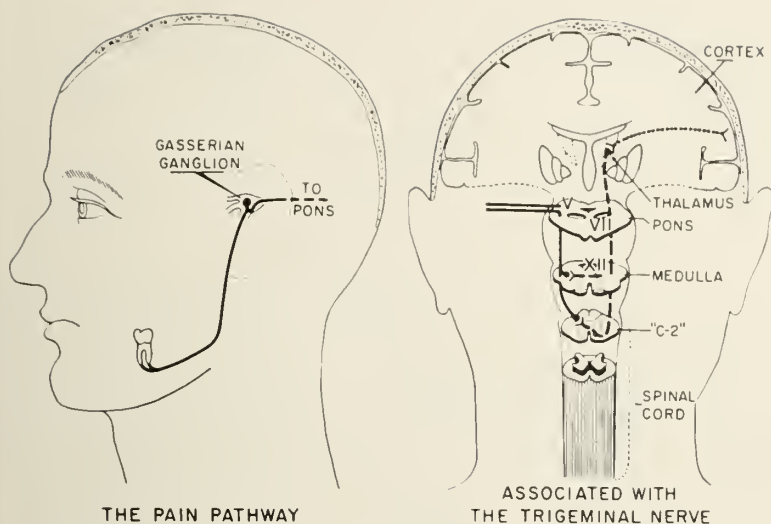


Fig. 1. A schematic representation of nerve conduction from the fibers of a lower tooth to their cortical termination. The primary neuron is seen terminating in the nucleus of the descending trigeminal spinal tract. This synapse ordinarily occurs in the medulla. Ophthalmic and maxillary fibers may terminate somewhat lower. The secondary neuron synapses in the posteromedial ventral nucleus of the thalamus, and finally the tertiary neuron terminates on the cortex of the posterior central gyrus.

proach the periphery of the pulp where the odontoblasts (cells which give rise to dentin) are located, and then form plexuses about the cells. The dilemma always begins at this point. The solution of this problem requires histologic proof that nerve fibers can be traced continuously from the pulp through the layer of odontoblasts and finally into the calcified dentin itself. Within the last two years, 2 independent teams of English histologists have offered microscopic evidence which shows nerve fibers coursing through the pulp and terminating in the dentin. Their method seems to satisfy all the specifications insisted upon by the dental histologist.^{3,4}

A review of the established anatomic pathway for trigeminal conduction of pain should be considered before examining the functional characteristics. Figure 1 is a simplified diagram of the pathway of pain as it may conduct from a lower molar tooth. Should the dentin of this tooth be

invaded by dental caries, the pulpal tissue responds. Usually, there is an attempt to wall off the irritant by laying down a protective layer of additional dentin. As the caries advances, the activity of the pulp increases. Actually, an inflammatory condition occurs. Since edema results, further congestion develops within the rigid walls of the tooth, and the first sensations of pain are experienced. The receptors for pain are free, naked nerve endings, earlier described as the plexuses about the layers of odontoblastic cells. The duration, intensity, and quality of the pain are affected by the extent of invasion of caries and the state of the pulpal tissues. The inflammatory process occurring within the pulp is termed "pulpitis." The variations of both the objective and subjective symptoms of pulpitis are all-important to the dentist as he uses these signs to determine the nature of the treatment.

After the pain receptor has been stimulated,

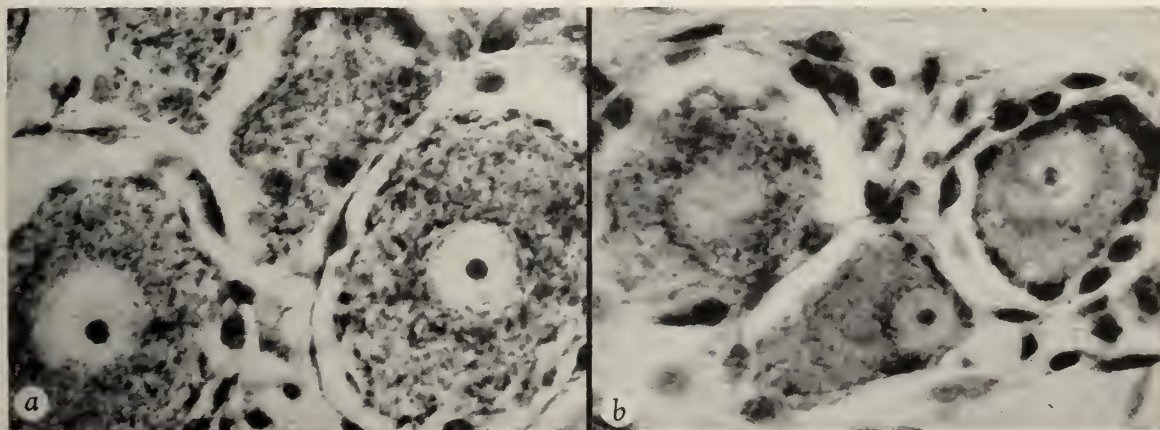


Fig. 2. Cells of gasserian ganglion. (a). Normal cells; (b) chromatolytic cells (Nissle stain; reduced from x495). Number of affected cells is increased after removal of nerve fibers from dental pulp. Smaller ganglion cells are believed to give rise to pain-conducting fibers.

the impulse conducts to the inferior alveolar nerve, then to the mandibular branch of the fifth nerve and to the gasserian ganglion, where the unipolar cells of origin are located. Up to this point, the impulse has been confined to the peripheral branch of the ganglion cell. To reach the central nervous system, the impulse is conducted via the central branch of this same cell as a part of the sensory root fiber which enters the pons.

The neurons of the gasserian ganglion have been studied extensively. They are unipolar cells ranging in size from 10 to 50 μ . It is thought that the smallest cells within the ganglion are concerned with the conduction of pain impulse.⁵ If only those nerve fibers that enter the dental pulp of the cat are removed carefully and eight to ten days are allowed for degeneration, nearly 5 per cent of the cells within the ganglion will be shown to be in some phase of chromatolysis (dissolution of the Nissl bodies) (figure 2). Some chromatolysis occurs continuously in cells within a normal ganglion, a factor which is considered when analyzing ganglion cells for degenerative changes.⁶

After the afferent fiber mediating pain has entered the pons, it descends, without bifurcating, into the descending trigeminal spinal tract. As shown in figure 1, the fiber terminates in the nucleus of the descending spinal tract. Pain and temperature sensations from the trigeminal nerve are carried exclusively by the descending tract and its nucleus. Only those painful impulses originating within the ophthalmic division of the trigeminal nerve reach the lowest levels of this pathway (caudal part of the medulla, possibly as low as the second cervical segment). The maxillary impulses terminate slightly higher, and the mandibular impulses end in the more superior portions of the descending spinal tract and its nucleus.

Neurons of the second order arise from the nucleus of the spinal tract and enter the reticular formation, where they are collected into the ascending ventral secondary or central trigeminal tract. As these fibers ascend the brain stem, they combine with fibers carrying other sensa-

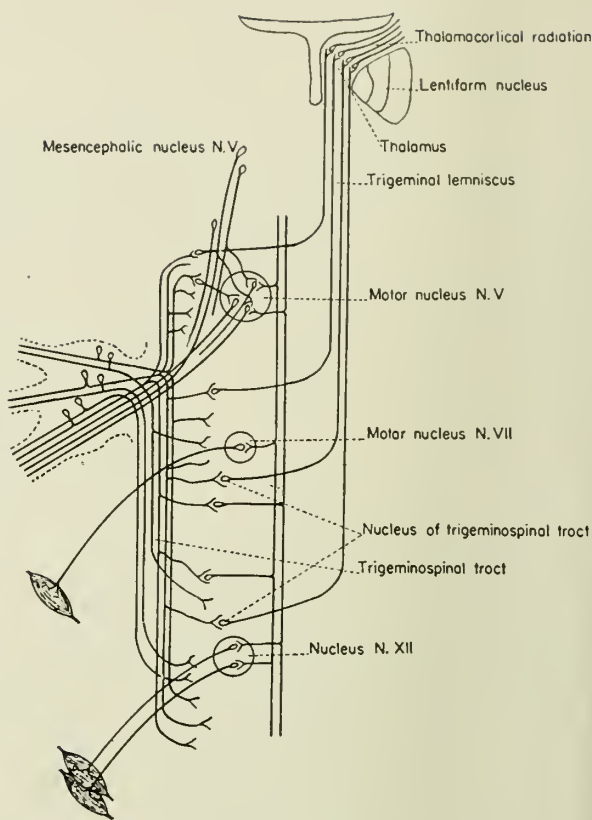


Fig. 3. Principal central connections of the trigeminal nerve (after Kuntz). Motor nuclei within the brain stem may receive fibers for reflex connections from trigeminal afferent fibers.

tions from the trigeminal nerve into a bundle, which is designated the "trigeminal lemniscus." The motor nuclei located within the brain stem may receive collaterals from either the crossing fibers or from fibers of the ascending tract. Numerous reflex possibilities may exist (figure 3). The fibers of the trigeminal lemniscus terminate in the posteromedial ventral nucleus of the thalamus. A third order of neurons originates within the thalamic nucleus, and, finally, these fibers terminate on the cortex of the posterior central gyrus.⁷ This latter circuit is anatomically indefinite; however, neurophysiologists have recently used electronic methods to untangle some of the many complex circuits. These functional aspects will be considered in the July Section on Pain.

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Arms and the Anesthesiologist

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IN PEACE OR IN WAR, the anesthesiologist may have to, and often does, carry out his duties in circumstances of intense stress. What such stresses might be in the event of total war is not presently clear to me. That they will be formidable is almost a certainty. I presume that in any consideration such as this, the civil defense forces, the National Red Cross, and practically every governmental agency at any level cannot be excluded. Very likely, any preconceived plan would of necessity be carried out in a variety of ways, not all of which could be foreseen, because of conditions that would exist in the different areas involved. In particular, we might reasonably expect that differences peculiar to the individuals concerned would arise.

RELIEF OF PAIN PARAMOUNT IN DISASTERS

As an example, the person responsible for anesthesia could not be expected, even in an emergency, to apply a method with which he was not at all familiar. By extension, it can be seen that it would be folly to devise a single plan and to suppose that such a plan could be put into effect throughout the nation. In any locality, a large number of blast injuries could suddenly become a major problem. It probably would be necessary to alleviate as much pain for as long as possible in many of the victims in whom treatment obviously would be futile. Under such conditions, morphine might be the drug most readily available and the one best understood generally.¹

Still, there are now many new drugs which enlarge upon the avenues of pain relief and permit a variety of choices.² A high-potency form of meperidine hydrochloride (Demerol hydrochloride) has been made which is called "anileridine." This is a very powerful analgesic agent, and it can be used in place of morphine. Paracodin, which is dihydrocodeine, is very effective. I presume meperidine hydrochloride (Demerol hydrochloride) itself would be generally available in event of an emergency demand and could be used, although I am not impressed with its analgesic properties. I am sure that methadone could be used for the purpose in question, and

it would be available generally. Levorphan tartrate (Levo-Dromoran tartrate), if available, would be very effective, especially if it were used with promethazine hydrochloride (Phenergan hydrochloride). Chlorpromazine hydrochloride (Thorazine hydrochloride) also might be used. Both promethazine hydrochloride (Phenergan) and chlorpromazine hydrochloride synergize the effect of narcotic agents.

For prolonged relief of pain, an antagonist can be used to cut off in various degrees the undesirable side effects of narcotic agents. Phenergan hydrochloride and Thorazine hydrochloride tend to prevent nausea, and several of the antagonists will more or less eliminate respiratory depression. Nalorphine hydrochloride (Nalline hydrochloride [N-allylnormorphine hydrochloride]) will, however, antagonize entirely the effect of morphine. Should the need arise, Lofran tartrate will relieve respiratory depression caused by practically any of the narcotic agents, and when it is administered in association with Levo-Dromoran tartrate, satisfactory relief of pain can be obtained without pronounced undesirable side effects. The same effects have been brought about by the use of daptazole with morphine. Here it is pertinent to say that it is now possible more or less to terminate Pentothal Sodium anesthesia at will by the giving of bemegride (Megimide).³ This means that there should now be a good opportunity to save the lives of some persons who have taken lethal doses of barbiturates.

Another provocative development is the possibility that material will be produced to relieve pain without incapacitating the person to whom it is given. On three or four occasions, I have administered Dolitrone in a suspension of 50 per cent polyethylene-glycol 200, injecting 10 cc. of a 10 per cent solution (1 gm.) intramuscularly. I have been able to assure a patient two hours of relief from pain with no other effects from this drug. I think it may be possible to

Read at the combined Armed Forces Medical-Dental Symposium for all Armed Forces of the United States, United States Naval Hospital, Great Lakes, Illinois, September 27, 1956.

use this agent in the treatment of the walking wounded.

Anesthetic ointments can be made simply. For example, Metycaine hydrochloride can be precipitated out of solution with sodium hydroxide, and the resultant oily material can be mixed again with hot Vaseline. When this mixture has solidified, it can be applied to painful areas and wounds and held on with dressings. The person thus treated may be able to maintain himself very satisfactorily, an action which might free members of a medical group for other pressing duties.

If casualties are inflicted in great numbers, as might well be the case, the possibilities are that any conceivable supply of morphine which might be on hand would soon be exhausted. Hence, a means which would prolong the duration of the effect of morphine would become of prime importance. Such a means exists. It consists of administering the morphine intramuscularly in 2 cc. of a 50 per cent solution of magnesium sulfate. Actually, this procedure is used by some persons addicted to morphine to conserve a diminishing supply of the drug. Very probably, it will extend the analgesic effect of the morphine from four hours without the solution to twenty hours when the solution is used.

Nalorphine (Nalline hydrochloride) antagonizes morphine. For this reason, if Nalline hydrochloride is available, it should be possible to counteract the effect of an overdose of morphine. This again is important, for overdosing has happened often enough in the care of the wounded to warrant serious consideration. Furthermore, the administration of Nalline hydrochloride can be helpful in deciding whether or not a person is addicted to the use of morphine. If addiction is suspected and actually is present, the injection of Nalline hydrochloride produces withdrawal symptoms in an addict in less than five minutes. This manifestation inclines toward a rather positive diagnosis. Still, I think it would be wiser to employ Lofan tartrate for such a purpose, since Nalline hydrochloride exerts a morphine-like effect unless morphine is present in the body, whereas Lofan tartrate does not have undesirable side effects and is said to antagonize all narcotic agents. Lofan tartrate, then, might be useful in the immediate care of patients who are in shock from hemorrhage. In such cases, the patient obviously is in a weakened condition in which he would be safer without the effect of a narcotic agent than with one.

An interesting contribution to the problem of

overcoming barbiturate intoxication has been made by Sem-Jacobsen and his associates.⁴ The procedure they describe was employed experimentally and thus far has no practical application, but it warrants repetition here.

Vigorous blasts of certain odors on the nasal mucosa of anesthetized patients had strong arousal effects. Not only were electric potentials recorded from the olfactory bulb and from various parts of the brain affected but the clinical state of the patient was changed. Thus, a patient under deep thiopental anesthesia would begin to respond shortly after a few blasts of burned rubber, tincture of valerian, or lilac were directed into the nostrils. Only a few odors had this strong arousal effect. Like room air, most of the odors tested had little or no arousal effect. Thus, it is conceivable that stimulation of the nasal mucosa with strong blasts of certain odors might aid in reviving patients from effects of overdoses of barbiturates.

THE PROBLEM OF SHOCK

I am attempting to mention some of the effects of drugs that I have observed in the hope that they might be useful to those who would be the first to be summoned in the event of mass casualties. Ready knowledge of some of these measures could become of prime advantage in speedy management of the medical and dental needs occasioned by total warfare.

In the presence of shock, there is no substitute for blood if much blood has been lost. On the other hand, as I have been saying since April 1946, at which time I encountered difficulty in interesting others in plasma volume expanders, dextran is useful in increasing the circulating volume of the blood. Knowledge of this simple physiologic fact is now common, and yet it is not commonly applied therapeutically. I understand that, since the expense of dextran is greater than that of polyvinylpyrrolidone, civil defense authorities have stocked a great amount of polyvinylpyrrolidone. An argument against the use of polyvinylpyrrolidone that has been given me is that it may be retained to some extent in the liver. Yet, solution of acacia also is retained in the liver, but it served a very useful purpose in World War I. Solution of acacia maintained many a casualty over an emergency period. The same is true of polyvinylpyrrolidone. For emergency use, I feel that it should be available. Personally, I find that during anesthesia and operation, the situation can be maintained very satisfactorily by administering a bottle of blood and then a bottle of dextran, then another bottle of blood followed by another bottle of dextran, and so on.

In many instances of neurogenic shock, I have been able to achieve rather dramatic results

within a few minutes by the intravenous administration of hydrocortisone or compound F. There are those who prefer to dissolve the hydrocortisone in an alcohol preparation with the solution to be given parenterally, administering it by the drip method. The objective of such a procedure is, of course, to achieve slow infusion of the agent and thus support of the patient over the time required for the solution to drip in. This procedure is useful, but for the purposes to which we are devoted here, expediency is of paramount consideration, and the prime concern is to produce the desired result with the least possible expenditure of time and effort. Hence, an agent useful in this respect is lyophilized hydrocortisone (Solu-Cortef), 100 mg. of which can be dissolved in 2 cc. of water, saline solution, or 5 per cent solution of glucose in water and injected quickly to obtain an excellent supportive effect. Moreover, this agent gives the patient a feeling of well being. Since this hormone does not produce untoward side effects, I venture to say that the time will come when shock will be partly treated with hormones, and it may even be that hormones will be employed in the prophylactic treatment of shock.

ENZYME CONTROL OF NERVE IMPULSES

There is a possibility that new researches in the enzyme activities of the nervous system may result in the production of new therapeutic agents more dramatic in their effects than any we now have.⁵⁻⁸ A brief description of one of these research projects follows.⁹

Many years ago, David Nachmansohn (who advised Wilson on this problem) showed that the enzyme cholinesterase controls hydrolysis of acetylcholine, which is immediately involved in conduction and transmission of nerve impulses. Nerve gases get their lethal punch by damaging cholinesterase and thus block vital nervous activity

Hundreds of white mice were injected with 100% lethal doses of the insecticide paraozon or DFP (diisopropyl fluorophosphate). While the two are not among the original German nerve gases, tabun and sarin, their biochemical activity is similar in many ways to that of the nerve gases, according to Wilson. About one to two minutes after gas injection, PAM was injected into the abdominal cavity. In all cases, life was preserved. Wilson cautions that PAM has not been tested in man.

Also PAM may be useful as an antidote for overdose of certain therapeutic compounds used in treatment of muscular nerve disorders. In addition, technics used to develop PAM promise to open the road to a better understanding of nervous system functions. In turn, this could result in development of chemical treatments for nervous disorders.

ANESTHESIA IN TIMES OF STRESS

Rather hastily, I have sketched the outlines of the emergency treatment of pain and of shock.

I come now to the consideration of anesthesia for operative conditions when catastrophe has struck. Very likely the major procedures required in such an event would be directed at major injuries to the chest. I am assuming that these would be treated first. My contention has always been that wherever a surgeon can operate, he can also administer an anesthetic agent, if need be. The corollary to this is that any patient who can tolerate an operation also can withstand anesthesia. I think it is established that one of the most important factors in a successful major surgical procedure on the thorax is the use of the intratracheal tube. I am so convinced of the validity of this view that I have on exhibit here a kit, designed for the purpose in question, which I prepared in World War II for the Medical Department of the Navy. This kit, I am told, was accorded much favor by medical officers who were departing on assignments where all the desired facilities might not be at hand. I am satisfied that an intratracheal tube is almost as valuable to the dentist in his major efforts as it is to the thoracic surgeon.

During the introduction of an intratracheal tube, the patient as a rule should be unconscious. It is quite possible to spray the nose and throat of the patient with a local anesthetic preparation to reduce the possibility of laryngospasm. However, if laryngospasm has occurred, a very small intravenous dose of succinylcholine will abolish it. Succinylcholine acts very quickly. The intratracheal tube can be introduced under direct vision with a laryngoscope, and, once it is in place, a patent airway is established and assured. Then, if oxygen is available, the patient can be kept oxygenated by means of the tube, and it is possible even to inflate the lungs, if such is desired. If nitrous oxide could be made available in the event of mass injuries, such as we are concerned with, a mixture of 50 per cent nitrous oxide and 50 per cent oxygen would be most useful. A 2.5 per cent solution of Pentothal Sodium has been used extensively for anesthesia, and the agent itself ought to be rather readily available in almost any area. If circumstances permit, Pentothal Sodium should be considered as an anesthetic agent to be supplemented by oxygen and nitrous oxide. Promethazine hydrochloride (Phenergan hydrochloride), if available, could be given intramuscularly, intravenously, or even by mouth as part of the preliminary medication. This agent makes it possible to reduce by about half the amount of Pentothal So-

dium to be used. Hence, it permits conservation of Pentothal Sodium and probably enhances the safety factor from the standpoint of respiratory depression.

It is considered desirable to employ atropine when Pentothal Sodium is being used, since the effect of Pentothal Sodium apparently is to increase the likelihood of laryngospasm. Atropine is administered to prevent the secretions from accumulating in the throat in sufficient quantity to irritate the larynx and, thus, to cause laryngospasm.

A small dose of morphine administered with the preliminary medication can be made more effective by the use of Phenergan hydrochloride, or Thorazine hydrochloride or Sparine. With the use of such a combination of agents, most operations within the thorax, on the neck and head, as well as major operations elsewhere in the body, can be performed satisfactorily.

The conditions just described are additionally desirable, because the hazards of explosion and fire are absent. Moreover, as I have said, the administration of Megimide makes it possible to terminate deep Pentothal Sodium anesthesia at will after a few minutes, and the deep effects of narcotic agents similarly can be ended by giving lorfan tartrate. This suggests to me the likelihood that the number of nurses who will be needed in the postoperative period can be reduced. At such a time, no doubt many patients would have been assembled in one area and treated there. Use of the special technics I have mentioned would permit one person to care for a large number of patients rather effectively in such circumstances.

Since thoracic injuries which would tend to limit respiratory motion in the postoperative period are very likely to occur during the infliction of mass injuries, I suggest that a mixture of PAB₁ be available for administration in intercostal block anesthesia. The object of this is to decrease or eliminate the occurrence of pneumonia and pulmonary edema. PAB₁ is a mixture of 1 per cent procaine hydrochloride, 2.5 per cent ammonium sulfate, and 2 per cent benzyl alcohol which I have used for this and other purposes for some time. I know of no untoward results associated with the use of PAB₁, so long as it is not injected intravenously and into the cerebrospinal fluid.

VENIPUNCTURE ON A MASSIVE SCALE

For purposes of instruction in venipuncture, I judge that the artificial arm made by Com-

mander Nicranen is the best approach to the problem we have. Certainly, it serves the purpose well. I believe the use of the plastic needle might be considered for venipuncture in cases of burns. At least, I have found it very useful for venipuncture in burned patients. If such patients can be reached early, the needle can usually be inserted into the greater saphenous vein at the ankle. After the needle has been introduced and anchored in position, it can remain there for a week, as a rule, without causing thrombophlebitis. The week's time at least should provide a sufficient period for the development of a planned treatment.

Sometimes it is impossible to locate a suitable vein. In such cases, the use of a sternal needle may be the answer, but the difficulty of maintaining immobility of the needle has not been overcome. Hence, if the sternal needle moves slightly, the hole in the sternum enlarges, and the solution being administered escapes from the hole and occupies subcutaneous space.

THE ART OF IMPROVISING

We have an inexhaustible plethora of books on every conceivable subject except one. We need a small book which will suggest expedient methods of improvising measures speedily in an acute emergency when all conventional procedures seem to fail. I am not prepared to attempt such a useful task, but I can offer a few illustrations. In World War II, men in charge of anesthesia who were stationed in remote areas found that they had no washers to use with the cylinders of compressed gases to be attached to a gas machine. This was discouraging, but native American ingenuity could have solved the problem. I have found, under such circumstances, that if I open the needle valve widely and regulate the flow of gas from the valve in the cylinder, the apparatus functions satisfactorily without a washer. Some of the gas is lost, but most of it passes through the needle valve, where the passage is entirely open, rather than escaping between the face of the valve and the surface that is being pressed against it by the thumbscrew.

Another illustration concerns masks or the lack of them. Sometimes masks for the gas machine are not available, or, if they are, they may not fit for one reason or another. In either event, a little rustic invention will produce a stovepipe-like mask at least 1 ft. long, fashioned from paper or any material that can be folded. When this improvised mask is placed on the patient's face, it serves the purpose adequately, because gases

are heavier than air and will be contained sufficiently within the makeshift mask to produce anesthesia. Use of any mask, of course, presupposes that a means is at hand to conduct the gases from the cylinder to the top of whatever facial device is to be used. Incidentally, oxygen can be administered very effectively by means of such an arrangement. If facilities become uncomfortably crowded, the Hingson midget gas machine might be considered for either anesthesia or resuscitation, for this equipment is made on a miniature scale.

For handling solutions and even blood to be given intravenously, the use of plastic bags instead of bottles should be kept in mind. They withstand the rough treatment common to emergency conditions, and improvements are being made constantly in the manufacture of plastic containers.

VIRTUES OF CIVILIAN INSTRUCTION

Dental needs in times of widespread catastrophe or massive military operations ordinarily do not

involve preservation of life, but these needs can be acute. I suppose that dentists would be charged with administering anesthetic agents, a task which they did so satisfactorily in World War II. During that war, I participated in training a considerable number of medical and dental officers who were assigned to the Mayo Clinic for this purpose. I have been told that, especially on Iwo Jima, some of the men whom I trained did a splendid job of administering anesthetic agents. Therefore, I would encourage the armed services to take advantage of the facilities that are available for training at medical centers over the nation. Certainly, it is intelligent planning to make use of those who are skilled in some particular specialty and are eager to help but have little opportunity to do so, because they are not a part of the armed forces. Such persons, like everyone else, are profoundly concerned about the possibilities of total warfare, but are also fully aware of the prime importance of being prepared for it and salvaging as many lives as possible from such a disaster.

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Book Reviews on Pain

ANESTHESIA FOR SURGERY OF THE HEART, by KENNETH K. KEOWN, associate professor of anesthesiology, Hahnemann Medical College and Hospital, Philadelphia; and senior anesthesiologist, Bailey Thoracic Clinic, Philadelphia, 1956. Springfield, Illinois: Charles C Thomas, 109 pages. \$3.75.

There are two medical centers in Minnesota where the technic of intracardiac operations for the correction of certain congenital anomalies and comparable conditions has attained a very high state of development. But there are not many such centers in the United States, and they are few indeed elsewhere.

Reports of the technics and results of such surgical procedures are appearing increasingly, but it would entail considerable search before an adequate paper on the anesthesia required for these operations could be found. Hence, the value of Professor Keown's slender volume is enhanced by the very lack of information on the subject in general.

Out of his impressive experience as senior anesthesiologist at the Bailey Thoracic Clinic and the Hahnemann

Medical College and Hospital in Philadelphia, Professor Keown has produced a work that ought to be received with gratitude by all who may be called upon to produce anesthesia for intracardiac surgical procedures. Data are given on catheterization of both the normal heart and the heart affected by such states as tetralogy of Fallot, pulmonary stenosis, and mitral stenosis. Mortality rates associated with the several congenital cardiac anomalies are presented. The management of anesthesia for the variety of corrective operations now being done is well explained, and the need for precision at all times is emphasized.

Complications which can ensue and postoperative management are accorded separate chapters. A chapter is devoted to each of such defects as tetralogy of Fallot, pulmonary stenosis, patent ductus arteriosus, coarctation of the aorta, atrial septal defects, mitral stenosis, aortic stenosis, mitral insufficiency, and aortic insufficiency. It is the view of Professor Keown that anesthesia for intracardiac surgical operations no longer is a matter of

(Continued on page 141)

Editorial

A NEW SERIES AND SOME NEW AGENTS

DR. JOSEPH A. GIBILISCO, of the Mayo Clinic, has agreed to prepare three papers on the fifth cranial nerve as a factor in pain problems. The first part of this series, which appears in this issue, deals mostly with the physical aspects of the nerve, the anatomic considerations and so on. The second part will appear in the Section on Pain of the July issue, and the third part will be printed in the October issue. This particular series is being undertaken to determine the effectiveness of concentrated attention directed to a particular subject. Comment in this respect is invited.

I have been using dihydrocodeine bitartrate (Rapacodin) for a number of patients with severe chronic pain. I have been particularly impressed with it because I find that a dose of 10 mg. administered by mouth is about twice as effective as codeine given in 1-gr. doses, and the effect of dihydrocodeine bitartrate persists about twice as long as does that of codeine. For severe pain, the dose of dihydrocodeine bitartrate should be 20 mg., and at the same time some antagonist such as Daptazole should be taken in doses of 10 to 20 mg. Other antagonists no doubt will appear; in fact, some have appeared already, such as mephentermine sulfate (Wyamine sulfate) and methyl-phenidylacetate hydrochloride (Ritalin hydrochloride). It becomes increasingly apparent that one ought to have at hand a considerable variety of different drugs which will produce a similar effect, meaning that we could use at least a half-dozen antagonists, examples of which are nalorphine hydrochloride (Nalline hydrochloride) and levallorphan tartrate (Lorfan tartrate). Although much progress has been made in the relief of chronic pain, some patients still do not react favorably to certain drugs. Such a result cannot be predicted, and in such an instance the different drugs must be tried. Therefore, it is not an easy or quick process.

Patients who have severe chronic pain do not become accustomed to it; and the longer the effect of a drug persists, the less well they seem

to tolerate the drug itself. On the other hand, the memory of pain fades rapidly, and while a patient is receiving a drug, he often is unable to report accurately the degree of pain he experienced previously. This means that occasionally it will be necessary to discontinue the medication and allow the pain to recur for purposes of appraisal. In this way it can be determined how effective the drug has been or drugs have been. Less clear is the situation in which a patient reports that his pain was relieved fifteen minutes after he had taken a placebo, yet the use of a placebo should be given a trial.

An important point in attempts at relief of severe chronic pain is that the patient have a good night's sleep. Here again a tranquilizing agent, such as promethazine hydrochloride (Phenergan hydrochloride), given by mouth in a dose of 25 mg. one hour before sleep is sought, will make any sleep-producing drug more effective than it would be without the tranquilizer. Among the sleep-producing drugs, the barbiturates are very effective, but many persons find, after use of a barbiturate, that they do not awaken as clearheaded as they might wish. In such instances, it may be desirable to try any one of the new drugs, such as ethchlorvynal (Placidyl), glutethimide (Doriden) and methypylon (Noludar). Usually, one of these drugs will be effective and useful, although it is nonetheless true that there are patients who are very resistant to sleep-producing drugs in ordinary doses.

Some time ago I called attention editorially to the need for a change in thinking about pain-relieving drugs. I pointed out that the antagonists now permit us to relieve pain safely by means of large doses of analgesic agents, meaning that an element of safety in the use of large doses of analgesics has been added rather recently. This is a very much improved situation from the standpoint of the patient, the physician, and all concerned.

Drugs and drug manufacturers are: Rapacodin, Billhuber-Knoll Corp.; Daptazole, A. & G. Nicholas, Ltd.; Wyamine sulfate and Phenergan hydrochloride, Wyeth Laboratories; Ritalin and Doriden, Ciba Pharmaceutical Products, Inc.; Nalline hydrochloride, Merck Sharp & Dohme, Div. of Merck & Co., Inc.; Lorfan tartrate and Noludar, Hoffmann-La Roche, Inc.; and Placidyl, Abbott Laboratories.

JOHN S. LUNDY, M.D.

BOOK REVIEWS ON PAIN

(Continued from page 139)

adaptation of long-established technics used in other fields of anesthesia, but that it has attained a status of its own which enables it to claim an independent autonomy.

The book is well printed, and the type face is easily read. There is no index.

JOHN S. LUNDY, M.D.

NARCOTICS AND NARCOTIC ADDICTION, by DAVID W. MAURER, Ph.D., professor of English and the humanities, University of Louisville; lecturer on narcotic addiction and criminal argots, Southern Police Institute, Louisville, Kentucky; and VICTOR H. VOGEL, M.D., medical officer in charge, European Activities, U.S. Public Health Service, Paris, France, 1954. Springfield, Illinois: Charles C Thomas, 303 pages. \$7.50.

This book is an unusual and highly interesting treatise by authors experienced in the subject. They explain the nature of addiction to drugs and discuss opiates and their synthetic equivalents. There is a good consideration of nonopiate sedatives which are considered addict-

ing and an excellent section on stimulant drugs. Information not easy to find is contained in the part on identification of drugs and proof of addiction. The treatment of addiction to narcotic agents occupies almost 40 pages of text, and much data ordinarily published in scattered sources are found in the chapter on legal controls for drugs of addiction. Narcotic addiction and crime, and drug addiction and youth, are sections which should occasion much sober reflection. The part on the argot of narcotic addicts is a glossary of terms commonly used by addicts of the underworld. An example is the word, "belt." To Webster, one of the meanings of "belt" is to strike a vigorous blow—not necessarily for liberty—but to a drug addict the word denotes the euphoria which follows an injection of some narcotic agent. The book has 16 references and an index.

This book will be fascinating to anyone who prescribes narcotic agents, or to government officials and law-enforcement officers, including the police, narcotic and customs agents, judges, probation officers, social and welfare workers, prison and reformatory officials, attorneys, criminologists, and the clergy and writers as well as physicians and dentists.

JOHN S. LUNDY, M.D.

Current Literature on Pain

MANAGEMENT OF INTRAVENOUS ANESTHESIA TO CONTROL RECOVERY TIME, by A. O. HUBBELL and H. W. KROGH: Oral Surg., Oral Med. & Oral Path. 9:403-410, 1956.

"The paramount objectives of general anesthesia for ambulatory patients are safety, patient acceptance, and control of recovery time We do not recommend premedication for ambulatory oral surgery patients except, in rare instances, for very nervous patients The surgery to be performed should be planned so that the operation will progress smoothly and decisively from one stage to the next Regardless of the length of the operation, the total dosage of Pentothal Sodium administered has a direct effect on the anesthesia-ambulation interval. To minimize the total dosage of Pentothal Sodium, the level of anesthesia should be no deeper than necessary to cover the immediate surgical stimuli The way Pentothal Sodium is injected affects recovery time equally as much as the amount injected. . . . We advocate the so-called 'surge technique,' that is, rapid injection of the induction dose or necessary increments in order to concentrate the drug and thus produce a greater effect than would be the case if the drug were injected slowly. The injector makes possible the repeated use of this principle to sustain anesthesia without using more concentrated solutions and without vein irritation The effect of Pentothal Sodium on metabolic rate and irritability makes possible the supplemental use of nitrous oxide with high percentages of oxygen. For longer oral surgery procedures, this supplement can allow less total dosage of Pentothal Sodium and shorter recovery time It is most desirable to keep the patient in the operating room until the swallowing, gag, and cough reflexes are active. We should not assume that the need for complete anesthesia equipment and the anesthetist's skill will not arise following operation until

these protective reflexes are active. Recovery from Pentothal Sodium is such a delightful, relaxed state that most patients would sleep happily for several hours in the recovery room if not regularly disturbed by the recovery nurse. A cup of coffee, given as soon as the patient is alert enough to sit up and drink it, is welcomed by most patients and markedly shortens the anesthesia-ambulation interval."

From LUNDY, J. S., and McQUILLEN, FLORENCE A.: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1956, Vol. 44. Copyright by J. S. LUNDY.

LONG-TERM FOLLOW-UP OF PATIENTS WHO RECEIVED 10,098 SPINAL ANESTHETICS; FAILURE TO DISCOVER MAJOR NEUROLOGICAL SEQUELAE, by R. D. DRIPPS and L. D. VANDAM: J.A.M.A. 156:1486-1491, 1954.

"The great hazard of spinal anesthesia in the minds of both physician and patient is the possibility of persisting paralysis after the anesthetic effects have disappeared. If, as many believe, spinal anesthesia has merits lacking in the other techniques, this problem of neurological sequelae must be placed in its proper perspective. We should know the incidence and severity of residual neurological disease, the factors contributing to these complications, and how best to prevent these effects or to minimize them when once they have appeared. During the four-year period from 1948 to 1951, every person who was given spinal anesthesia at the Hospital of the University of Pennsylvania was studied according to a prearranged plan. A total of 8,460 patients given 10,098 spinal anesthetics was available for study. The incidents associated with lumbar puncture, the anesthetic employed, and the immediate and postoperative effects were consistently and carefully recorded Questions were asked that could lead to the early discovery of the types

of neurological disease alleged to result from spinal anesthesia. Before leaving the hospital all patients were told to expect, and were requested to reply to, a brief questionnaire that would be mailed to them within six months . . .

"In the delayed part of this study all of the patients were sent the following questionnaire six months after operation, with a letter explaining the purpose of the communication: (1) 'Would you choose this type of anesthesia again? If not, why?' (2) Has anything occurred since your discharge from the hospital which you believe may have been related to spinal anesthesia? (3) Do you feel perfectly well now?' If a patient receiving the questionnaire six months after anesthesia returned the enclosed postal card marked 'yes, no, yes,' we felt justified in stating that no neurological complications of spinal anesthesia had developed . . . The fact that 1,352 patients, or 15.9 per cent of the total, were given spinal anesthetics more than once provided the opportunity to assess this factor in relation to subsequent complications . . .

"After the 8,987 administrations of spinal anesthetic on which we were able to check after at least six months, there was only a single instance of incapacitating neurological disease. Eventually this was proved to be due to a meningioma of the spinal cord that prior to spinal anesthesia had caused no recognizable symptoms. As is well known, lumbar puncture, presumably by altering cerebrospinal fluid dynamics, may bring into the open such a quiescent lesion. Symptoms began at once in this patient but were incorrectly attributed to the anesthetic. Myelography was avoided because an arachnoiditis was suspected. However, such a study was eventually carried out, the proper diagnosis was made, and the tumor was removed. This patient recovered completely. This case can hardly be used as an argument against spinal anesthesia. Indeed, it should serve as a warning to those physicians who are eager to attribute all postoperative complications to spinal anesthesia; had this patient not received spinal anesthesia, a correct diagnosis would have been reached many months earlier, in all probability. There were no instances of adhesive arachnoiditis, the so-called cauda equina syndrome, or transverse myelitis; nor was there any evidence of a septic process in the meninges or epidural region. Numerically, headache constituted the most common sequela to spinal anesthesia. The incidence of postural headache was 9 per cent in males and 15 per cent in females, with an over-all incidence of 14 per cent . . .

"Evidence that postural headache is related to lumbar puncture and altered cerebrospinal fluid pressure is overwhelming. In the series of patients who were given spinal anesthesia after they were put to sleep and who never knew that they had been given spinal anesthesia, the incidence of postural headache was identical to that in the larger series. This observation reduces the role of the psyche almost to the vanishing point. There were 8 cases of abducens nerve palsy in the series, probably all secondary to the greater cerebrospinal fluid loss associated with the use of a 16-gauge lumbar puncture needle. The headaches described by the patients receiving general anesthesia were obviously different from those following spinal anesthesia in the majority of instances. In 66 administrations of spinal anesthetic, or 0.7 per cent, the patients subsequently experienced a feeling of numbness or tingling in the thighs, legs, feet, or perineum. Objectively, in 23 of these cases, diminution to the

sensation of pinprick was demonstrated in the areas pointed out. In none of these patients were the symptoms or signs progressive, and the majority of complaints disappeared within one year. There were very few similar complaints in the general anesthetic series. After 85 administrations of spinal anesthetics, or 0.9 per cent, the patients reported symptoms that, for want of a better term, we have called 'irritative.' There were complaints of leg cramps and twisting, sensations in the lower extremities . . . Nine (0.9 per cent) of the patients in the general anesthetic series had identical complaints. Twenty others of the general anesthetic series described leg pain of a more standard type . . .

"In two patients unilateral foot drop developed after spinal anesthesia, but in one patient in the general anesthetic series the same sequela developed. In all, the paralysis improved markedly within a year. One of the most disturbing groups of sequelae occurred as the result of traumatic lumbar puncture. In 4 patients, severe backache with radiation of pain into the legs developed. Spasm of the back muscles was marked and quite troublesome. In 2 of the 4, a spinal anesthetic was not injected into the subarachnoid; so the relationship to lumbar puncture was convincing. All patients in this group improved greatly within three to eighteen months. Postoperatively a number of patients complained of pain or numbness in the area at which a paresthesia had been elicited at the time of lumbar puncture; this could have been avoided by better technique. None of these complaints were permanent. Nine patients with preexisting neurological disease not recognized prior to spinal anesthesia reported sequelae that might be related to the method selected. Three patients with lumbar disk syndrome found their pain and subjective paresthesias increased. A patient with spondylitis had a similar experience. One patient with a history of hemiparesis and bladder weakness six years before spinal anesthesia suffered a temporary return of difficulty in voiding after anesthesia. A patient with a history of encephalitis and leg weakness ten years preoperatively noted a return of weakness in the legs for several weeks following spinal anesthesia. A girl with latent herpes zoster in the area of the lumbar spinal nerve roots was given spinal anesthesia for a mistaken diagnosis of acute appendicitis. Two weeks after the herpetic lesions appeared, this patient complained of numbness in the ipsilateral leg; this numbness lasted for several months. A man with meralgia paraesthetica prior to operation had a recurrence of pain and numbness of the thigh after anesthesia. The final case was that of the patient with the spinal cord tumor, referred to previously . . .

"Our experience indicates that the mortality rate following spinal anesthesia is lower than that recorded after general anesthesia in comparable patients undergoing comparable types of operations."

From LUNDY, J. S., and McQUILLEN, FLORENCE A.: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1954, Vol. 41. Copyright by J. S. LUNDY.

CORRECTION

In the article "Modern Technics for Relief of Pain" by John S. Lundy which appeared in the January 1957 issue of *THE JOURNAL-LANCET*, a sentence read "Lorfan tartrate will bring about marked amelioration of the depression caused by morphine or a barbiturate, such as Pentothal Sodium and it does not have side effects, such as those of Nalline hydrochloride." The words "or a barbiturate, such as Pentothal Sodium should have been omitted.



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Clinicil Selections in Dermatology and Mycology, by FREDERICK REHM SCHMIDT, M.D., associate professor of Dermatology, Northwestern University Medical School, Chicago, and contributions by 36 specialists from various lands, 1956. Springfield, Illinois: Charles C Thomas; Oxford, England: Blackwell Scientific Publications, Ltd.; and Toronto, Canada: Ryerson Press, 505 pp. Cloth \$10.50.

This is an excellent volume on selected subjects in the fields of dermatology and mycology. It has been written by 36 outstanding authorities from several countries, particularly the Americas, and each chapter summarizes the author's knowledge on a specific subject. In addition to general dermatologic conditions, there are chapters dealing with the unusual disorders, including those prevalent in the tropics. The relationship of enzymes, vitamins, minerals, fats, and proteins to skin diseases is discussed. The role of vasospasm as an etiologic factor in disease in general and its relationship to skin diseases in particular is emphasized. A chapter is also devoted to the discussion of the psychosomatic dermatoses. The superficial and deep mycoses are quite thoroughly covered. At the conclu-



sion of each discussion, treatment methods are given with emphasis on simplification. The bibliography is very good. The material is not presented in the usual textbook manner, since it is a reference book for dermatologists and other physicians interested in these subjects.

ELMER M. HILL, M.D.

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Out of the Test Tube: The Story of Chemistry, by HARRY N. HOLMES, Ph.D., 1957. New York City: Emerson Books, Inc. Fifth edition, revised and expanded, 313 pages. \$4.50.

Any popular book on science that goes through five editions must have some merit, and *Out of the Test Tube* has much. It is a readable account of chemistry from its fumbling

beginnings in prehistory to its frightening development in the age of atomic fission and fusion. It is the "success story" of chemistry and chemical engineering, told in language that is, in general, understandable to the educated layman. It is written with enough allusions to history, classical fable, and biography to keep it from being dull. The author does not suffer from any false modesty about the contributions of chemistry to civilization, but he is good-humored about his pride in the accomplishments of his profession. He is an optimist, too, as when he concludes the book with the final sentence "Truly atomic fission may, in the end, do more good than harm."

For the physician who studied chemistry and physics more than ten years ago and has not studied them seriously since, there are several chapters in the book well-worth reading. "The Fall of the House of Uranium," "The Grand Plan," and "Atom Smashing" tell the unfolding story of atomic structure and atomic disintegrations in a fascinating way. There is background information on many other chemical subjects which would be both interesting and rewarding to any nonexpert in chemistry.

MAURICE B. VISSCHER, M.D.

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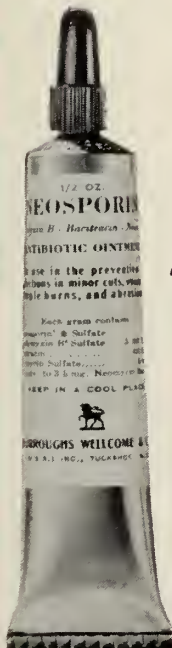
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A.C.H.A. News

We wish to extend a hearty welcome to the following new members whose applications for membership have been approved by the Executive Committee of the Association:

The University of Notre Dame, Notre Dame, Indiana. Representative: Dr. Joseph B. Crowley, director of Student Health Services. Alternate: Dr. Sherman L. Egan.

Grinnell College, Grinnell, Iowa. Representative: Evelyn Gardner, dean of women. Alternate: Mrs. Geneva Williamson, R.N., head resident nurse.

Longwood College, Farmville, Virginia. Representative: Roy A. Moore, college physician.

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Dr. George W. McCoy, Jr., has been named director of the Student Health Services at Lehigh University, Bethlehem, Pennsylvania. Dr. Joseph Pomponio has been given the post of assistant director.

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Otto J. Keller, M.D., director of the Student Health Service at Northern Illinois State College, DeKalb, Illinois, is seeking an associate physician. Doctors interested in the position should write directly to Dr. Keller.

Plans have been completed for a new Student Health Center at Northern Illinois State College.

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A reminder! Reservations should be made as soon as possible with the Lord Baltimore Hotel if you are planning to attend the coming meeting April 25 through 27 in Baltimore. As outlined in the preliminary program, a truly excellent meeting is in prospect. Plan to be there.

News Briefs . . .

North Dakota

DR. C. J. GLASPEL, prominent Grafton physician, has assumed his official duties as president of the Federation of State Medical Boards of the United States. Dr. Glaspel was named president-elect for this high office in 1956 to succeed Dr. Joseph J. Combs, Raleigh, South Carolina.

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THE 14 PHYSICIANS who have recently been licensed by the North Dakota State Board of Medical Examiners are: Donald L. Olson, Black Building, Fargo; Norman B. Ordahl, Rogers-Gumper Clinic, Dickinson; William E. Nelson, Grand Forks Clinic, Grand Forks; Chris M. Christu, Fargo Clinic, Fargo; James B. Murray, Dakota Clinic, Fargo; Philip Andrews, 2308 7th Avenue North, Grand Forks; Jacob Ehrenreich, care of Dr. J. J. Ayash, Minot; Bobby G. Smith, West Fargo; William J. Perry, Veterans Administration Hospital, Fargo; Theodore A. Harris, Winnipeg, Manitoba; Anatole Glen, San Haven; H. Pieter Smeenk, Quain and Ramstad Clinic, Bismarck; Robert C. Thom, Neepawa, Manitoba; and Hamish M. Mann, Winnipeg, Manitoba.

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DR. REZSO ZURMUEHL, refugee physician from Budapest, recently arrived in McClusky where he will establish medical practice after his internship is completed. Dr. Zurmuehl graduated from medical school in his native Budapest in 1952 and there served two and one-half years of internship as gynecologist and obstetrician in a suburban hospital and one and one-half years on the

The Treatment of Cataracts

HUGH W. HAWN, M.D.

Fargo, North Dakota

THE EXISTENCE OF CATARACTS has been known for over three thousand years and yet, even now, we do not know why lens changes develop in some people that markedly reduce vision while others live to a ripe old age without apparent visual impairment.

Cataracts may be divided into two basic classes: congenital and acquired. The majority of congenital cataracts are idiopathic. Of those with a specific etiology, the most common are due to maternal rubella. If this disease is contracted in the first trimester, approximately 40 per cent of the infants are born with cataracts. However, if rubella occurs during the second trimester, only 10 to 15 per cent of the babies have cataracts. Cataracts very rarely develop when the infection occurs in the last three months of pregnancy. Severe intrauterine iridocyclitis or inflammation of the iris and ciliary body produces cataracts in the newborn. We believe the infection is transferred from the maternal circulation to the uvea of the fetus and is caused by liberated toxins; the susceptible lenses develop protein coagulation forming cataracts. Unfortunately, half of the infants born with cataracts also have other eye abnormalities. Most common of these are strabismus, optic atrophy, and disease of the choroid and retina. For this reason, results of surgery for congenital cataract are often disappointing.

The treatment of congenital cataracts depends on the size and location of the lens opacities.

Centrally placed opacities, if they are dense, markedly interfere with vision. However, peripheral opacities cause no visual loss and are of only academic interest. Surgery, generally needing of the cataracts, is advised for those infants with poor vision. The operation is performed when the infant is 6 to 12 months of age and is followed by the prescription of strong, farsighted, postcataract glasses. As in adults, after the cataract is removed, the uncorrected vision is poor so that glasses must be worn at all times.

Acquired cataracts are much more common than the congenital variety. Studies have shown that at least 90 per cent of adults have some form of cataract. The majority of acquired cataracts are also of unknown etiology. The usual type are called senile cataracts, although they are not necessarily found only in the aged. About 10 to 15 per cent of cataract surgery is performed on people under the age of 55. Acquired cataracts are always progressive. However, the visual loss varies with each individual. It is impossible to estimate the amount of visual diminution that will occur in a given time. The nuclear and posterior cortical cataracts progress most rapidly, and, in these varieties, we are better able to advise the patient when to plan for future surgery.

Cataracts are frequently associated with diabetes. In young individuals, the lens opacities are characteristic of the disease and are occasionally reversible. However, in older people, the cataracts differ in no way from the ordinary senile

type. Trauma to the eye often results in cataract formation. The injury may be a perforating wound producing a tear in the lens capsule or a nonperforating injury with the resulting cataract caused by contusion of the lens. Some ocular diseases, such as severe anterior uveitis and retinitis pigmentosa, are among the more uncommon causes of cataracts. Also, as is well known, prolonged exposure of the eye to x-rays produces lens opacities. These latter generally develop six months to two years after radiation.

Aside from the occasional reversal of cataractous lens changes in young diabetics, the medical treatment of cataracts is unfounded and useless. Many ethical practitioners prescribe drops for use in the eyes of people who have early cataracts. The drops have no influence on the progression of the cataracts but are prescribed merely for psychologic reasons. Likewise, oral medications and special diets are ineffective in halting cataractous lens changes. Several years ago, much publicity was given to an injectable extract of fish lens protein which, according to the reports, caused regression of cataracts. These claims were thoroughly investigated and found to be entirely fraudulent.

Whether surgery is advised depends on the maturity or ripeness of the cataract and whether it is bilateral or unilateral. Immature unilateral cataracts are not treated surgically. Surgery is indicated for those patients with bilateral cataracts when the vision of the least affected eye is not sufficient to read, work, and carry on their usual activities.

Surgery is advised for unilateral mature cataracts in order to obtain a better peripheral field of vision. In the presence of a ripe cataract, a person is unable to see objects in the lateral field of vision. Accordingly, removal of the cataract is recommended so that peripheral vision is obtained which enables the individual to see large objects, for example, an automobile approaching from that side. A mature cataract occasionally becomes swollen and blocks the filtration angle of the eye causing a sudden onset of glaucoma. To prevent this complication, it is well to remove the cataract when it shows signs of maturity. A unilateral mature cataract produces a grayish-white pupil in contrast to the normal black pupil of the other eye. In young people, this color difference is socially and psychologically unacceptable. In order to restore the normal black pupil, cataract extraction is advised.

After cataract surgery, the vision is very blurred and only large objects are visible. With proper cataract glasses, the vision is markedly improved so that it is possible to read and carry on nor-

mal activities. However, these lenses produce a change in the size of the image so that objects appear to be one-third larger than normal. When such a pronounced disproportion in the image size is seen with each eye, diplopia results. For this reason, patients who have had a unilateral cataract extraction and have normal vision in the other eye are not fitted with cataract corrective lenses. If glasses are necessary for the normal eye, only a plano or uncorrected lens is prescribed for the eye that has undergone surgery. In a few cases, a contact lens may be worn which does not result in diplopia. Unfortunately, contact lenses are tolerated by only a small percentage of people so that, for the most part, the vision of the operated eye is left uncorrected.

Using the above statement as "a rule of thumb," cataract extraction is recommended at a different level of visual acuity for each individual. If, for example, the patient is an office worker in whom a relatively moderate amount of visual diminution seriously interferes with his occupation, surgery is advised when the cataracts are less advanced than in one whose occupation does not require prolonged attention to close work. With few exceptions, the physical condition and the age of the patient do not contraindicate cataract surgery. There is little or no shock associated with the operation, and early ambulation minimizes the danger of venous stasis. The eye incision heals as uneventfully in the aged as in younger, more robust patients. Cataract extraction is done on only one eye at a time. Usually, the most advanced cataract is removed first. The other eye is operated upon at the convenience of the patient; generally, two or three months after the first operation.

On the morning of surgery, Seconal or Nembutal is given orally. To increase the effect of sedation, Demerol or Phenergan is also given with the sedative. Morphine sulfate is never used in cataract surgery because of the frequent occurrence of postoperative nausea and vomiting with resulting danger of wound rupture. The pupil of the eye to be operated upon is dilated with atropine and Neo-synephrine drops. If the pupil is well dilated, the cataract can be removed without disturbing the shape of the pupil. Occasionally, however, the iris is rigid and the pupil will not dilate. When this occurs, a complete iridectomy is done which converts the pupil to the shape of a keyhole. To avoid postoperative infections, chloramphenicol or Albamycin is given the day prior to surgery and also on the day of surgery. These particular antibiotics are used because they produce a larger concentration of the drug in the tissues of the eye than

do most of the other antibiotics. For the most part, cataract surgery requires only local anesthesia. This is accomplished by several instillations of tetracaine drops in the eye followed by the injection of a mixture of procaine and hyalase into the muscle space behind the eyeball. The orbicularis branch of the facial nerve is also anesthetized to prevent squeezing of the eyelids. In the nervous or young patient, intravenous anesthesia is used.

Very little pain or discomfort is experienced in the postoperative period. Usually, there is a stinging pain in the eye for the first two or three hours. This is easily controlled by a single dose of codeine. More recently, when indicated, one of the tranquilizing drugs is given during the immediate postoperative period. The postoperative care of cataract surgery patients has been greatly simplified during the past ten years. Formerly, after removal of the cataract, both eyes were bandaged for the following seven or eight days. The patient was kept on his back in as nearly an immobile position as possible. This was aided by placing sand bags on either side of the head and also on both sides of the trunk. With the advent of better methods and materials for suturing the cataract incision, the patient is now allowed far more liberty. After removal of the cataract, only the eye operated upon is bandaged. The patient is immediately allowed to lie on the side opposite the operated eye. If desired, the back rest is elevated to a 45° angle. Bathroom privileges are allowed on the day of surgery, although the patient is cautioned to ask for assistance in getting out of bed and walking to the bathroom. Special duty nursing help is rarely

necessary. On the second postoperative day, the patient is up and about and goes home on the third day. The wound in the cornea heals rather slowly so that, generally, glasses are not prescribed until the fifth or sixth week after surgery. A cataract spectacle lens is heavy and difficult to learn to use. Objects appear larger and closer than normal, and there is initially much distortion of the images. The visual field is smaller and, if only one eye has had surgery, depth perception is not normal. The patient actually must "learn to see" all over again and usually is not comfortable for several weeks after obtaining the glasses.

A discussion of cataract surgery would not be complete without an explanation of the acrylic or Ridley implant. This clear plastic lens is molded into the shape and size of the normal lens and is inserted into the lens space behind the iris and pupil. In order to maintain its position and prevent migration of the implant, the posterior lens capsule is left in situ when the cataract is removed. In successful cases, the usual cataract spectacle lens is not necessary, and the patient attains binocular vision with or without ordinary spectacle lenses. Unfortunately, in many cases, the results are not satisfactory. Too often infection develops, the lens implant migrates from its original position behind the pupil, and healing of the wound is delayed. Under ordinary circumstances, we can expect 94 to 95 per cent good results from routine cataract extractions. In the case of the Ridley implant, satisfactory vision is obtained in only 25 to 30 per cent, and often the eye must eventually be removed because of a diffuse ocular infection.

VESTIBULAR FUNCTION can be tested easily and safely in the physician's office by the alcohol-caloric method. The patient sits erect with the head inclining toward the horizontal, and 70 per cent alcohol solution is instilled into the ear with a medicine dropper. A jet of compressed air under constant pressure is directed through a Boucheron speculum toward the posterosuperior quadrant of the tympanic membrane for thirty seconds. The patient's head is then held erect and hyperextended. The extent and duration of nystagmus created by stimulation can be determined by having the subject focus on the operator's finger held 2 ft. above the face and moved toward each extreme of lateral gaze. The procedure is not intended to supplant the quantitative caloric testing available in university clinics.

HERMAN I. LAFF, M.D., and G. L. SMITH, M.D.: *Arch. Otolaryng.* 64:409-411, 1956.

Personal and Social Adjustment in Old Age

JOHN E. ANDERSON, Ph.D.

Minneapolis, Minnesota

STATISTICS on the problems of aging, with which we have been deluged, show that our concern arises from 3 major sources. Two of these receive much emphasis in the literature, and the third is not stressed quite so much. All of us are familiar with the first source, the great prolongation of life brought about through better medicine, improved nutrition, more sanitation, the control of disease, and higher standards of living. One phase of longevity is not quite so familiar. Jones, the physiologist, has shown that today a person of 55 is as healthy as a person of 50 was twenty-five to thirty years ago. In other words, we are, age for age, more effective, better preserved, and healthier than our forebears.

The second source comes from both the greater longevity and the increase in the size of our population. Once we were a young population; now, with each passing year, there are more older people both in number and proportion.

The third source arises from our changing conception of aging and of the social values related to it. Up to thirty years ago, life was essentially work- and money-oriented. Very few persons retired. Everyone kept on working until they became so ill or so inadequate that they had to stop. But, our society has developed the concept that workers retire at the age of 65, and that thereafter they must somehow move from our work-oriented and money-oriented society into personal and creative activities which will occupy their time until death. A fundamental problem arises: how can a person move from work to leisure and remain mentally and physically sound? In 1890, despite their poorer health, 63 per cent of the men over the age of 65 were in the labor force, as compared to 45 per cent in 1950. Each year, as millions more retire, this proportion decreases.

For this discussion, I shall be primarily concerned with the person between 65 and 75. However, there are two other groups with age-related problems. One concerns people between 45 and 65 and arises out of our pension and security plans which create unemployment problems at

this age level which are not easily solved. The other group includes people who reach the age of 75 or 80 and require custodial or bed care.

What about the person between the age of 65 and 75 who possesses his major capacities and is faced with the problem of living without a primary work orientation? First, let us consider some misconceptions. Many think of this problem in terms of residence in a very pleasant and idyllic place to live, such as Florida or California. However, when we look at the facts concerning the movement of older people, we find that those who make such a move comprise a very small proportion of the total and that many of them return to their former communities. At this very moment, the percentage of people over 65 in Minnesota is larger than it is in either California or Florida. Thus, the problem of older persons is one of the local community and of our state, rather than one of an idyllic distant place.

The next misconception concerns institutional care. Many think institutions for older persons provide the major portion of their care. If we look at the figures for the whole United States, we find that slightly less than 5 per cent of the persons over 65 are in institutions, and that 95 per cent live out in the community. There is no indication that the proportion of institutional care for persons between 65 and 75 will increase, although it is very clear that the need of people above 75 for institutional care will steadily increase and must be met in some fashion.

Studies of the institutional environment reveal that people in institutions do not adjust to their surroundings as well as those living outside. Because many persons enter institutions when they have physical and mental difficulties, the institution may include some people who are not able to meet the demands of outside life. But, it is also possible that we do not know how to create the type of environment in an institution that will be conducive to continued, effective adjustment. To meet this problem, we need more research. If we look for studies that will answer questions about the management, organization,

JOHN E. ANDERSON is a professor at the Institute of Child Welfare, University of Minnesota.

Presented at the Governor's Conference on Aging, November 27, 1956.

and program of institutions, we will be rather hard put to find appropriate research, or principles based upon research. Hence, a major problem in the immediate future is learning how to create a stimulating and effective environment for the older persons in institutions.

In the past, we located institutions for old people in beautiful green spots a long distance from the center of the community. Thus, we made it very difficult for relatives or friends to visit them and cut off sharply their contacts with the old environment. We thought of green lawns with overhanging trees, shady walks, and so on. However, some of the research on this problem suggests that institutions should be located near the center of things so that the older person can wander into the stores now and then, go to a movie conveniently, maintain his church contacts, and meet familiar people. It is better to be close to life than remote from it.

Another misconception is that older persons cannot learn or adjust, as reflected in the proverb that you cannot teach an old dog new tricks. Although good studies have been made in this area, we need many more. Those made show clearly that older persons do not lose their capacity to learn new behavior and to adjust to new situations. There are, however, some limitations. First, older persons, when compared with young people in their prime, are a little slower and take a little longer time to reach the same levels of performance. Elderly people should be told that, although a little more time and effort is required to reach the same level of performance, they will reach it by expending the additional time and effort. Second, older people are also much more concerned about their mistakes, probably because they have lived for over fifty years in an environment in which mistakes have been costly. A young person makes his mistakes, doesn't worry about them, and builds new behavior. Hence, the older person, in order to learn well, needs to see mistakes as essential parts of learning. Third, the older person is greatly concerned about what other people think of him. He doesn't want to appear a fool to his associates, whereas a younger person who is willing to make a fool of himself profits from his experience.

Let us then look at people of 65 to 75 in our society. As mentioned before, 95 per cent of them are essentially on their own, most of them are living as couples, a smaller portion lives alone, but some live with their children or with other relatives. Because women survive men by about six years, there is a fair proportion of widows who, with single women, create a special problem that needs particular consideration.

Generally, the adjustment of these older persons who are on their own is quite good except for the transition period after retirement. One of the studies in this area was made by Granick, who studied adjustment patterns in detail in communities in Florida composed of middle-class persons who, before retiring, had been stable citizens back in their own communities. In a favorable environment, these people generally solved their own personal, social, medical, and health problems quite satisfactorily. They worked out good patterns of living, methods of social contact, and usually met their responsibilities well. Because these people had good work records over a long period of time back in their own communities, the groups were somewhat selected. Such results, however, serve to correct the idea that old people are necessarily problems.

In approaching the problem of the adjustment of people 65 to 75, I would like to summarize a group of studies made by Friedman and Havighurst on the meaning of work and retirement. These reports illustrate many of the basic principles involved in considering the adjustment pattern and point to some of the remedial procedures necessary to meet the difficulties encountered by retired people. Friedman and Havighurst interviewed many people from various occupations and studied the way in which they met problems of retirement. They had the cooperation of unions, professional societies, trade and business groups, and self-employed persons.

One striking result reveals that adjusting to retirement requires a long time. The man of 65 faces the same type of problem that the married woman faces fifteen or twenty years earlier when she wakes up one morning to find her children gone and her household restricted to her husband and herself. The care of the home is simple in comparison to what it had been earlier. The housewife who now lacks a real center of interest needs to change her role and develop engaging activities that will fill the time on her hands. As the family patterns change, a change of role becomes inevitable. Many women develop interests in community, philanthropic, religious, or social activities.

In the life of the man, the work situation fulfills much the same purpose as does the family with its preoccupations for the woman. Interviewing older men about their former work revealed that the social contacts afforded by work were more dominant than the work itself. These men missed the gang, the office group, the team, the organization to which they had devoted so much of their life. Part of the problem of readjustment involved filling the gap in social

relations or, more specifically, the day-to-day or hour-by-hour contact with other persons provided by the work situation. This is an interesting finding because most of us do not usually think of work as an area in which substantial group and social relations are built.

Next, the study showed that the man had a great deal of time on his hands, without specific ways of filling it. True, the first six weeks or two months passed quickly and were rather like a vacation. Then, time weighed heavily because the holding power of the leisure time and recreational activities he had anticipated were gone.

The wives, on the other hand, adjusted to their husbands' retirement without any particular difficulty because their tasks, interests, and social contacts with friends and neighbors were much the same as before retirement. The retired, single working woman — a considerable number were studied who had been in sales work — when compared with men in comparable work areas, showed adjustment patterns similar to those of working men. She was lost; she had to reorganize her life, and she sought time-filling activities.

There is also a pronounced relation to earlier experience. When retired steel workers in the city were compared with retired coal miners in southern Illinois, a radical difference in adjustment was found. The city steel worker thrown out on his own literally had almost no resources. Some months were required for him to work out a schedule. He wandered about the city for awhile, watched a construction job, dropped into the barber shop to read the newspaper, went somewhere else for a short time, then turned up somewhere else, and then returned home. It is of some interest that, over a period of time, these patterns became consistent and that thereafter, much the same routine was followed day after day. With the appearance of a stable daily schedule, emotional and personal problems tended to disappear. But, building a personal schedule of time-filling activities took six months to a year and was very difficult for the city worker.

The coal miners, however had lived all their lives in rural or semirural areas on a 3 to 5 acre plot on which they had a cow, a few chickens, a garden, and perhaps an acre or so of some crop. Upon retiring, the transition was made very easily and effectively, because they continued and increased their activities on the land and did not have to work out completely new schedules.

When the data was broken down in terms of the educational level of those interviewed, it was found that, in general, the higher the educational level of the person, the better he met retirement. In other words, education increases

an individual's repertoire of skills and interests with the results that when he meets a difficult transition period, he has a greater variety of activities to which to turn and can, therefore, make a better adjustment.

I might also point out that these investigators found that self-employed people, particularly doctors, lawyers, small businessmen, and so on, made the transition relatively easily because they literally almost never retire. Farmers, too, do not characteristically retire. They continue some farming activities. There is evidence that retiring farmers who move into a city or a radically different community do not adjust as well as those who maintain some type of activity on the land.

Salaried persons and wage earners experience a sharp cutoff which is clearly defined. One day the worker is fully employed, the next, he has nothing to do. These people are in major industries, many types of business, public service, governmental service, and, in fact, in every occupation with a fixed retirement age.

This group of studies interested me very much, because it seemed to emphasize a major problem in adjustment to aging that has not received much discussion. In much of our thinking and talking about activities for older persons, we consider relatively short-time interests and activities. We think of recreation and entertainment. But, if we look at the meaning of the work pattern in the life of the person, we see that it is important not only from the standpoint of time, but also from the standpoint of social relationships and continuing interest patterns. And when we ask how the activities we propose for older people measure up to the model provided by work, deficiencies in our thinking appear. We think of hours or days instead of continuing activities which can be carried on for a long time and to which the individual can dedicate himself and, thus, secure substantial satisfaction. Hence, it seems to me we should think in terms of a work substitute for the older person, not of leisure activities or recreation. What is needed is a major concern that will take up substantial time. To maintain himself as a healthy and effective person, the older person must build a schedule of interests and activities which will last for six months, a year, two years, or more and which will give him a center about which other activities can be oriented.

I am talking mainly in terms of the individual. For his own mental health, it does not make too great a difference whether the activity is individual or social, provided it is socially acceptable. But, society is also concerned with the nature of his activities and, other things being equal,

wants him to contribute to society. Because these older persons have a great reservoir of skills, are wise and experienced, and have survived the strains and stresses of sixty-five years of life, society could well use them. Society's problem is one of developing ways for effectively utilizing the skill, wisdom, and experience of these people in activities that will contribute to a whole program of good living. Thus, the personal and the social problems become interrelated.

When we begin to consider facilities, we must determine whether they offer long-term or short-term opportunities. We should seek activities which are complex enough to hold a person for a long time. Otherwise, interest is lost and he is back where he started. We must stop thinking in terms of entertainment, which lasts only for short periods, and think more in terms of positive, continuing, and reasonably complex activities to which the old person can dedicate himself for substantial periods of time and from which he can derive satisfaction.

May I add a word about the complexity factor. Studies of children have shown that when activities are too simple, they either quickly lose interest or proceed to complicate the activity. Activities which will function for a long time must be challenging, complex, and present real opportunities for using a person's resources.

When we examine the activities we propose for older people from this point of view, we find that many of our programs are deficient, because we think in terms of short-time activities, entertainment rather than education, and superficial concern rather than real involvement. Let us think of work substitutes that will do psychologically that which work did during a person's period of maturity.

I would like to couple this concept with self-help. We have moved from a period in which we largely thought of elderly people in terms of protective care into a period in which we recognize the importance of the older person doing as many things as he can for himself. It is what he does rather than what is done for him that preserves him. Hence, we encourage participation. In considering services for older people, we think of temporary, part-time, and special services that will maintain participation and self-help as long as possible. The modern design of institutions, homes, and equipment for older persons reflects our return to a type of thinking that is common in many of our attitudes about children.

With children, we are interested in what the present can contribute to the future. We look to what the child will be doing three months,

six months, and a year hence. We expect him to find his way through the present to a solution and new skill in meeting similar problems in the future. While parents or teachers could do the job better, we let the child do it so that he may learn.

Too much of our popular thinking about older people suggests that it doesn't matter what they do, because they are going to die anyway, they have made their contribution to life, and they are through. This is defective thinking about any living being. Life is a movement from the present into the future. Although we are relatively inept and ineffective in the present, we become self-maintaining, independent, and responsible individuals in a few months or a few years. I admit that this approach presents real difficulty in the case of handicapped or over-dependent persons. But our main obstacle is a limiting conception which interferes with thinking through the problem and determining means of establishing or re-establishing the self-maintaining activities. It is perfectly proper for an older person to begin very complex activities and to start acquiring real skills instead of remaining passive and concerned with superficial activities at an entertainment level. Note, however, that I am not opposed to short-time entertainment and recreation. They have a real place in life, but they do not replace major and long-continued activities.

SUMMARY

Elderly people's need for continuing social relations and the contribution which the work pattern makes to them was first stressed. The second major point emphasized the value of a work substitute, or a major activity, with which the older person can identify himself and which will have some kind of continuity and sufficient complexity to hold his interest over a long period of time. We should examine our thinking about, and our programs for, older people in the light of this concept in order to see whether we really are providing them with opportunities for self-realization. This ties in with the modern emphasis upon self-help in the design of housing, equipment, and services for older people. The importance to society of developing ways to use the resources and capabilities of the older person was pointed out. We are in a period of social transition when new roles, and perhaps undesirable roles, are thrust upon persons over 65. We must learn to create opportunities which will use their experience, skill, and wisdom and which will improve their personal adjustment while enabling them to contribute to the well-being of all.

TACE with Androgen in the Treatment of Women in Postmenopause and Senescent Years

A Preliminary Report

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DURING THE PAST DECADE, there has been increasing acceptance of the use of dual hormone therapy in the management of human postclimacteric states. Estrogens and androgens are now known to have specific activities apart from their roles in sex physiology. They are vitally concerned with such metabolic functions as mobilization and deposition of calcium and phosphorus, maintenance of a healthy vascular tree, and protein anabolism. Many of these functions become impaired after the climacteric as a result of improper balance of these hormones.

Although sex hormones were first isolated about thirty years ago, the earliest reports on their combined use did not appear until some fifteen years later. In 1942, Kurzrok and Rothbart¹ reported improvement in 16 patients with the menopausal syndrome following concurrent use of estrogens and androgens. Several groups of investigators²⁻⁴ have shown independently that such balanced hormone combinations produce better relief of symptoms than may be expected from single hormone therapy. In 1952, Glass⁵ called attention to the advantages inherent in combined estrogen and androgen therapy and cautioned against its being discredited because of reports of side reactions that follow the misuse of sex hormones singly or in combination. He indicated that estrogen-androgen therapy, if properly used, rarely causes complications. More recently, Homburger⁶ pointed out the rationale for the use of estrogens and androgens in what he terms "mutually neutralizing doses" in the long-term treatment of osteoporosis.

The protein anabolic effect of estrogen is enhanced by the addition of androgen, and the combination induces a sense of euphoria and improved well-being, and restores libido.^{3,7} Es-

trogen-androgen combinations also prevent and possibly even reverse the senescence process.^{8,9} Urinary symptoms accompanying the female postclimacteric are often improved by a combination of hormone therapy, since androgens are renotropic and estrogens stimulate growth of epithelial cells of the urinary bladder.⁷

Because of its relative freedom from undesirable side effects and its unique ability to become stored in the body fat, TACE has been used continuously in our clinic since it was first made available to us in 1950. Three of us (J.S.G., G.W.H., and C.B.D.)¹⁰ reported in 1952 on the effective use of TACE in the treatment of the menopause. The prolonged and gradually decreasing estrogenic stimulation after a single course of oral TACE therapy made it possible for many of our patients to undergo a physiologic adaptation to their ultimate postmenopausal state. After the menopause, however, minimum hormone therapy must be continued in some patients to control such symptoms as hot flushes, nervousness, irritability, depression, fatigue, insomnia, paresthesias, and vertigo, which comprise the "postmenopausal syndrome."

We felt that TACE with Androgen might be a well-balanced and nearly ideal estrogen-androgen combination for trial in our postmenopausal and senescent patients. Although Benson¹¹ found that daily doses of TACE up to 18 mg. do not usually produce prolonged effects, the minimum fat storage which may occur with doses as small as 6 mg. might help to provide a more constant day-to-day effect. Unlike many other estrogenic substances, synthetic or natural, TACE seldom causes unpleasant gastrointestinal side effects, such as nausea and vomiting. Each capsule of TACE with Androgen contains 6 mg. of TACE and 2.5 mg. of methyltestosterone. This amount of TACE is sufficient to provide the minimum daily estrogen requirement. A daily dose of 2.5 mg. of methyltestosterone, an orally effective androgen, is sufficient to improve the general "feel-

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ing of well-being" and to provide the desired protein anabolic support; but it is insufficient to produce virilization even with prolonged administration. This is particularly true when methyltestosterone is used concurrently with TACE.

MATERIAL

This study was conducted among 34 carefully selected, ambulatory, white, female, private patients whose ages ranged from 37 to 70. Of these patients, 18 had previously undergone a natural menopause and complained of a variety of postmenopausal symptoms. Similar complaints were made by 6 additional patients who had undergone a surgical menopause and by 1 patient whose normal estrous cycle had been interrupted by irradiation therapy. The remaining 9 patients were senescent as well as postmenopausal. Eight patients suffered from senile vaginitis, 1 from osteoporosis, 7 from perineal relaxation with accompanying urethral or bladder symptoms, and 1 from dry skin. The single patient whose symptoms had resulted from irradiation had been given this therapy one year previously for carcinoma of the cervix. One of the patients who had undergone a surgical menopause also had carcinoma of the cervix. Panhysterectomy had been performed in 2 patients because of extensive endometriosis. Two others had also been subjected to this procedure, but the pathologic diagnosis was not known to us. One of the surgical patients had undergone

a bilateral oophorectomy. It is our opinion that TACE with Androgen may safely be given to selected patients who have had genital cancer.

Of the 34 patients under study, 11 had been treated previously for their symptoms. Of this group, 5 patients had received TACE therapy and had experienced partial to complete relief. The other 6 patients were selected either because of side effects or because of inadequate symptomatic control by previous medications.

METHOD OF STUDY

All 34 patients were started on TACE with Androgen, 1 capsule twice daily for the first ten days. Each patient was then maintained on a single capsule daily. The clinical response was evaluated at monthly intervals. All of the patients had been taking the medication for one to nine months at the time of this report. Two patients alternated at monthly intervals between TACE alone and TACE with Androgen. Both have made unsolicited statements that they feel much better when taking the combination.

RESULTS

The results of TACE with Androgen therapy in this series are represented in figure 1. Symptomatic relief was highly gratifying. In those patients in whom the drug was stopped, symptoms returned within a day or two. In a few cases, longer lasting or, possibly, permanent relief resulted after one or two months of therapy.

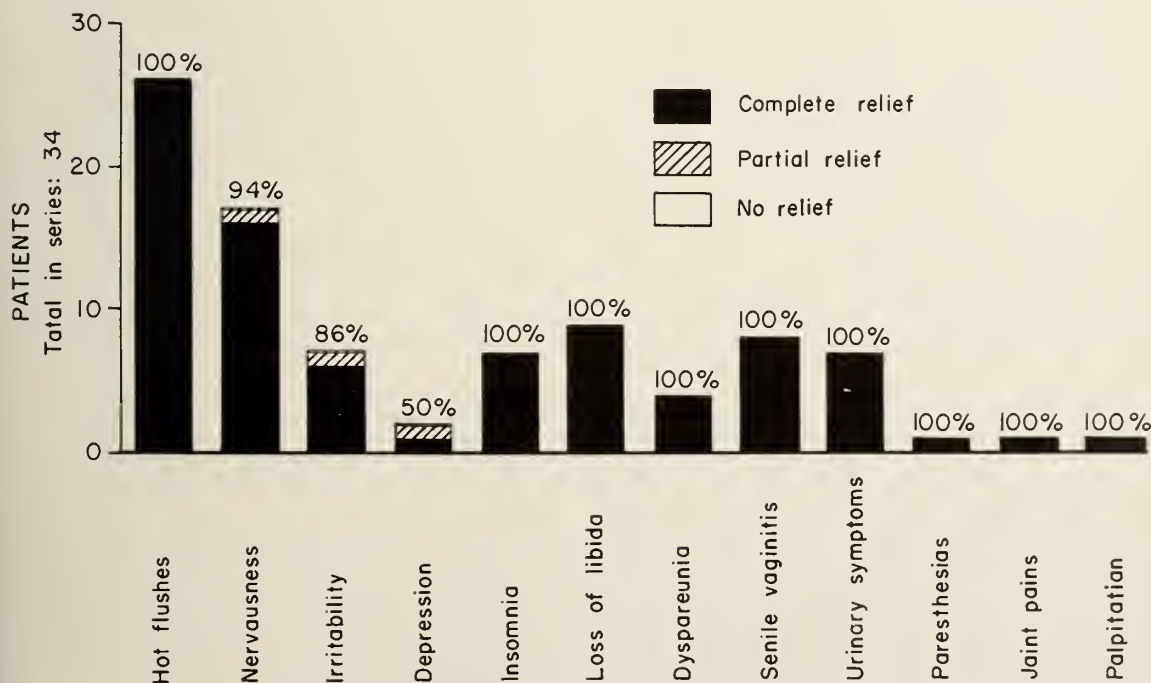


Fig. 1. Relief of postmenopausal symptoms by TACE with Androgen.

All of our 26 patients with hot flushes obtained complete relief on TACE with Androgen. Sixteen of 17 patients who complained of "nervousness" were completely relieved, while 1 obtained partial relief. Of 7 patients with complaints of irritability, 6 were relieved, while the seventh was partially relieved. Of 2 patients who were depressed, 1 was completely relieved and the other was partially relieved. The latter was the same patient who had experienced only partial relief of her irritability and nervousness. All of 7 patients with insomnia were able to sleep normally as a result of TACE with Androgen therapy. Other subjective symptoms which were completely relieved were loss of libido in 9 patients, dyspareunia in 4, and paresthesias, joint pains, and palpitation in 1 case each.

After one to three months of treatment, we noted complete reversion to a healthy mucosa in all 8 cases of senile vaginitis. Urge and stress incontinence and symptoms of bladder or urethral irritation were completely relieved in all 7 patients with these disorders. One of the patients with senile vaginitis had also complained of a restricted introitus which seemed to improve. Dry skin in 1 patient was completely relieved.

None of the patients in this study experienced adverse side effects of any sort. Urinalyses and blood counts showed no changes attributable to the drug. The majority of patients were highly gratified by the improvement which they experienced. The feeling of well-being was general. One of the elderly women with severe urge and stress incontinence who had been almost bedfast for months was able to resume her housework after three weeks of treatment. Another postmenopausal patient requested a supply of the medication to take on a prolonged European trip.

DISCUSSION

Recognizing that estrogen therapy alone is often insufficient to bring about complete relief of symptoms associated with the postmenopausal and later years, we decided to try a carefully balanced estrogen-androgen combination in a selected group of patients with these symptoms.

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TACE with Androgen was chosen because it contains amounts of estrogen and androgen which are not considered feminizing or virilizing, and yet it provides the minimum supportive amounts of these hormones needed in such cases. Furthermore, our previous experience with TACE alone demonstrated its effectiveness as an estrogen and its superior patient acceptance with freedom from the side effects of nausea and vomiting.

The improvement we have noted among our patients with distressing urinary symptoms suggests an effective protein anabolic effect and improved muscle tonus resulting from TACE with Androgen therapy. The consistently good results in the management of all subjective symptoms in this group of patients are very encouraging. It has not been our purpose, however, to compare TACE with Androgen with other similar compounds, or to control our evaluation of the compound through double-blind or other techniques. Rather, we have attempted to demonstrate whether TACE with Androgen is a satisfactory estrogen and androgen combination in the management of the postmenopausal syndrome.

SUMMARY

1. TACE with Androgen, a new, orally effective combination of an estrogen with an androgen, was employed in the management of the postmenopausal syndrome in 34 private patients.
2. All of the 26 patients disturbed by hot flushes were completely relieved.
3. Of 17 patients complaining of nervousness, 16 were completely relieved.
4. Complete relief was experienced in most instances of irritability, insomnia, loss of libido, dyspareunia, paresthesias, joint pains, and palpitation attributable to hormone imbalance.
5. Objective and subjective improvement was noted in 8 patients with senile vaginitis and in 7 patients with urinary symptoms associated with perineal relaxation.
6. No adverse side effects were observed.
7. TACE with Androgen deserves further trial and more thorough evaluation as a well-balanced estrogen and androgen combination.

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Skid Road—A Health Challenge

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FROM A VERY EARLY DATE, the transient and migratory population in the United States, largely a by-product of the seasonal and marginal employment characterizing industrial civilization, has presented a persistent problem in the control of communicable disease. This problem has been of particular concern in the eradication of tuberculosis. Little concerted effort has been made to investigate the complexity of personal and cultural factors presented and their relationship to unfavorable reactions toward medical advice and public health measures.

The general nature of the threat inherent in an unstable population group was recognized by Fanoni,¹ but it was not until the 1920's that the special features of cultural inaccessibility, desire for geographic escape, and rejection of care by those most in need were recognized as characteristics of a fluid subculture.^{2,3} More recently, the leveling off of tuberculosis incidence rates has been pinpointed as a continued high rate among homeless men.^{4,5} The intensity of social factors in connection with deaths from this disease has also been indicated in a study by Arnason.⁶

Untreated tuberculosis is still a problem among families of migratory farm workers;⁷ nevertheless, Chaucer⁸ and Ottenberg⁹ have demonstrated that with the advent of programs for x-raying jail inmates, the primary difficulty lies in effectively searching out and controlling the disease among habitués of the flophouse milieu, frequently referred to as "skid road." The term apparently originated among loggers in the western United States. It refers to a rough trail along which logs are skidded until they fall of their own weight into a stream, a process quite descriptive of the social experience of these men. Because of greater cultural familiarity, most scholars have substituted "row" for "road." The cases drawn from this portion of the population represent a high rate of far-advanced tuberculosis and of alcoholism. Both the stage of disease and the diagnosis of alcoholism are reported to be highly associated with the problem of control, particularly as it is reflected in irregular discharges

from sanatoria,¹⁰⁻¹³ a fact foreshadowed in the earliest statistics of record.¹⁴

Neither the medical nor the social literature contains an intensive analysis of the social climate of "skid road." An appreciation of this atmosphere, apart from socioeconomic status, is essential for understanding the peculiar nature of the health problem. A useful approach is to make comparisons with another urban phenomenon traditionally known as the slums. The latter is characterized by high birth rates, large family units, intense economic competitiveness, constant striving for upward social movement, and an ubiquitous, occasionally oppressive familiarity in daily affairs. The slum dweller is provincial, often growing to maturity without traveling more than a few miles from home. Durable associations in gangs and other primary groups are the rule. Both loyalties and antagonisms tend to be deep and lasting. Work histories are likely to be stable, at least with reference to the same occupational classification. By way of contrast, few persons are born in skid road; family units are rare; economic behavior is listless and occasionally communal; and anonymity is both prevalent and positively valued. Human associations are superficial and highly transitory; geographic mobility is extremely pronounced; and employment takes the form of short jobs, often for a single day, of an amazing variety.

A thoroughgoing analysis of the skid road environment and the characteristics of its inhabitants, the multiple disease patterns prevailing, and the full scope of difficulties related to public health management are manifestly beyond the limits of a single investigation. The purpose of the present study was to illuminate some of the social background of a sample of these tuberculous individuals, to indicate the extent of allied ailments, particularly alcoholism, and to explore the implications for one criterion of control—the criterion of irregular discharge.

MATERIALS AND METHODS

For several years, Firland Sanatorium in Seattle, a county tuberculosis facility, had been receiving an increasing number of skid road patients.

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It was almost impossible to designate the exact area so that a consecutive sample representative of the whole could be drawn. On the other hand, a number of locations had consistently contributed a high frequency of patients, and these were all within the heart of the area loosely indicated in local references. Because these addresses constituted a focal point in the disease reservoir, they were taken as the "population" to be sampled. Consecutive admissions to the sanatorium were studied. Previous experience had shown that the one important bias in serial sampling was the seasonal variation in occupational and economic indices. To compensate for this, admissions were tabulated for thirty months from January 1, 1953, to June 30, 1955. In that way, the sharpest deviations, which occurred in the autumn, were held to a minimum.

During that time, 155 patients were admitted from the 12 locations selected for study. All but 2 of these were men, and the 2 women were dropped in order to simplify analysis. The patients were classified from hospital face sheets by age, occupation, marital status, race, nativity, and whether they had been referred from jail or from other sources. Alcoholic diagnosis at time of admission, as well as history and clinical evidence of venereal disease, head injury, peptic ulcer, and cardiovascular disorder (heart disease or abnormality, varicosity, and hypertension) were tabulated from the admission history and examination. Stage of disease according to the 1950 edition of Diagnostic Standards and Classification of Tuberculosis, presence of active cavitation, and initial sputum results by concentrated smear were determined from the hospital charts. The record of irregular discharges was obtained from file cards. All discharges other than those with medical advice, except when the patient was readmitted within thirty days, are classified as irregular.

A few major comparisons were tested by Chi-square (corrected for continuity), but the treatment is essentially descriptive.

FINDINGS

Of the 153 skid road men, 85 were over the age of 50, and the mean was 56.5 years. Only 4, all of them under age 45, were married; 48 were divorced or separated; 11 were widowed; and 90 had never married. Occupations given showed 89 unskilled, 31 semiskilled, 28 skilled, and 5 clerical or supervisory. Only 12 were natives of the state, and 34 were foreign born. Nonwhites included 10 Indians, 7 Negroes, and 6 others. The sample contained 67 who were referred from jail.

At the time of admission, 72 were diagnosed alcoholic. Clinical data showed histories of venereal disease and cardiovascular disorders in 48 cases each, 45 head injuries, and 17 with a history of peptic ulcer. Disease classification revealed 54 far advanced, 69 moderately advanced, and 18 minimal. There were 63 with active lung cavities, and the initial sputum determinations of 85 patients were positive.

Irregular discharges were tabulated to December 31, 1955, six months after the end of the sampling period. By that time, 67 of the group had received irregular discharges, 25 had been readmitted, and 14 of these had again left against medical advice. The known record of previous admissions to various sanatoria was 59, so that at the end of 1955 there was a history of at least 237 admissions for these patients, excluding those regularly discharged. In the thirty months of the sampling period, the sanatorium had admitted 1,533 men, and in the three years ending December 31, 1955, there were 259 men irregularly discharged. As already noted, 81 of these were among the skid road group. The difference in proportions resulted in a corrected Chi-square value of 152.85, representing a chance probability of less than .0001 if the conditions are taken as randomized.

Of the 67 skid road patients who had taken an irregular discharge at some time during the observation period, only 20 were alcoholics, while 47 did not have that diagnosis. This comparison yielded a Chi-square of 12.90, indicating a negative relationship at the .0005 confidence level between alcoholism and irregular discharge. By way of contrast, the far advanced cases accounted for 34 of the 67 and showed a positive association at the same level with a value of 11.38 for Chi-square. Of the 67 patients referred from jail, 31 were among the discharges. This represented no significant association.

In view of the performance of the far-advanced cases, the severity of disease and corresponding behavior of the various categories were of particular interest. Three aspects of clinical data — far-advanced disease, cavitation, and positive sputum on admission — were combined in order to differentiate a group which, for purposes of analysis, were classified as "high risk." There were 40 such patients in the sample or 26 per cent of the total. For the most part, the various classifications by age, occupation, and so on, did not vary more than a few percentage points from that figure. Table 1 shows the important exceptions. The proportion among nonwhites is least indicative of the series but was included for the sake of further comparisons. In comparing the

TABLE 1
COMPARISON OF PROPORTIONS OF PERSONS PRESENTING
HIGH RISK* AMONG 153 "SKID ROAD" MALE
TUBERCULOSIS PATIENTS

	<i>Proportion of high risk cases</i>
Total sample	26%
Jail referrals	18%
Single men	19%
Foreign born	30%
Nonwhites	30%
Nonjail referrals	33%
Divorced and separated	44%

*For the purpose of this analysis, a case of high risk was arbitrarily defined as far advanced with cavitation and initial sputum specimen positive on concentrated smear.

low percentages for single men and for jail referrals, it should be noted that no association was found between these categories. The divorced and separated men presented the greatest relative risk to the public at the time of admission.

Irregular discharges appeared in the records of 44 per cent of the total, and 24 per cent of those irregularly discharged were in the high risk class. These proportions were fairly constant by age and occupation, but table 2 illustrates the consistent variations in other respects. The divorced and separated comprised 54 per cent of the irregularly discharged, and 46 per cent of such discharges presented a high risk at time of admission. Only 28 per cent of the alcoholics took irregular discharges, and a mere 10 per cent of these had been high risks. The low frequency of irregular discharge among the foreign born was particularly noteworthy, as was the very small number of high risk patients receiving irregular discharges among the single men. While the proportion of high risks irregularly discharged is, in general, consistent with the proportions given in table 1, this is not true of jail referrals. The distinction between these and the men referred from other sources is not in the percentage who were irregularly discharged but in the extent to which irregular discharge coincided with high risk. Jail referrals included few high risk cases, but nearly all in that class received irregular discharges.

Other aspects of irregular discharge were equally as important as the number of cases involved. The tendency to repeat the performance and the length of time in the sanatorium prior to the occurrence are two of the chief considerations. Data on 4 classifications of particular interest are given in table 3. It can be seen that the alcoholics had a good record except for a slight tendency to leave at an early date if they did decide to leave against advice. The length of stay before irregular discharge was the only respect in which divorced and separated men

did better. The unfavorable record of jail referrals was exceeded only by the nonwhite category. Of the 11 nonwhites in the irregular discharge group, 7 were Indians.

On the whole, the performance of the group was much like that reported by Lorenz and associates¹⁵ in a study of tuberculous veterans. The majority of irregular discharges occurred within three months after hospitalization and only a very few after as long as ten months. In terms of the frequency of irregular discharges among far-advanced cases, the results agreed with those of numerous investigators. The alcoholics, however, presented a very sharp contrast with previous data. No doubt the difference was due largely to the fact that other studies had usually dealt with heterogeneous samples. The skid road group had an extremely significant record of irregular discharges and contained a very high proportion diagnosed as alcoholics. When it is borne in mind that the total of male admissions contained an excessive number of skid road cases, it is not difficult to imagine that the performance of skid road patients could be expressed as a significant number of irregular discharges among alcoholics, when submerged in a mixed sample.

The unusual nature of the skid road problem

TABLE 2
TOTAL CASES AND HIGH RISK* CASES IRREGULARLY
DISCHARGED AMONG 153 "SKID ROAD"
MALE TUBERCULOSIS PATIENTS

	<i>Patients</i>	<i>Irregular discharges</i>	
		<i>Total</i>	<i>High risks</i>
Total sample	153	67	16
Whites	130	36	9
Native born	119	61	14
Single men	90	35	3
Nonjail referrals	86	36	9
Nonalcoholics	81	47	14
Alcoholics	72	20	2
Jail referrals	67	31	10
Divorced and separated	48	26	12
Foreign born	34	5	2
Nonwhites	23	11	7

*For the purpose of this analysis, a case of high risk was arbitrarily defined as far advanced with cavitation and initial sputum specimen positive on concentrated smear.

TABLE 3
COMPARISON OF DISCHARGE RECORDS AMONG 153
"SKID ROAD" MALE TUBERCULOSIS PATIENTS

	<i>Irregular discharges</i>		
	<i>Per cent</i>	<i>Rate*</i>	<i>Average stay</i>
Total sample	44	1.21	5.6 months
Alcoholics	28	1.10	4.9 months
Jail referrals	46	1.32	4.0 months
Nonwhites	48	1.55	3.7 months
Divorced and separated	54	1.27	5.4 months
Far-advanced disease	63	1.18	6.7 months

*This rate is the mean number of irregular discharges among those who received at least 1 discharge of that type, that is, the mean index of repetition.

appeared in a number of ways other than those demonstrated in the analysis. The very great preponderance of male cases is itself a characteristic of tuberculosis on skid road. Another interesting point was the contribution by just 12 addresses of nearly 10 per cent of all male patients. During the period of observation, 27 men died of tuberculosis at Firland Sanatorium, and 10 of these deaths or 37 per cent were from the 153 in the present sample. Since many of the others were long-term custodial cases, this is a remarkable figure. The group was also distinctive because 44 per cent were referred from jail.

SUMMARY

Migrant workers, particularly those inhabiting "skid road," have long presented a vexing problem in public health, reflected most directly in the control of tuberculosis. Although attention has recently been called to this peculiar subculture, no studies have been designed to show its relationship to the incidence of tuberculosis, the rising number of alcoholics among the tuberculous, and the perennial problem of irregular discharge from sanatoria.

Twelve addresses in the Seattle skid road were selected for consistently high numbers of tuberculous patients admitted to Firland Sanatorium. Within thirty months, 153 men were admitted. They included 47 per cent alcoholic, 44 per cent admitted from jail, 97 per cent unmarried (including 59 per cent who had never married), 58

per cent unskilled occupation, 22 per cent foreign born, and 13 per cent nonwhite. The mean age was 56.5 years. Histories of venereal disease, head injuries, cardiovascular disorders, and peptic ulcer were numerous. Their tuberculosis was characterized by 35 per cent far-advanced cases, 41 per cent with cavitation, and 56 per cent with sputum concentrates positive at time of admission.

The sample had an extremely significant record of irregular discharge when compared with all men admitted during the period. Alcoholics were typified by a very significantly low rate of irregular discharge, less tendency to take this type of discharge when representing a high risk to the public, and less tendency to repeat but a slight tendency to stay a shorter time before receiving such a discharge. Jail referrals were not significant for the number receiving these discharges, but those who did were characterized by high risk, repetition, and short hospital stay. Far-advanced cases and patients who were divorced or separated had excessive proportions of irregular discharges. Nonwhites, especially Indians, had a consistently poor record.

The results agreed with various other studies concerning the performance of far-advanced cases and the relatively short average stay prior to irregular discharge. Previous reports were sharply contradicted on the question of a positive association between alcoholism and irregular discharge.

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Observations on Full-Term Newborn Infants Receiving an Acidified Milk Formula

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ACIDIFICATION, a time-honored method of modifying whole milk, provides increased digestibility, absorption, and assimilation of nutrient products ingested by the newborn infant.

It is the purpose of this paper to clinically evaluate and compare the response of 120 newborn infants who were fed a standard evaporated cow's milk formula and a modified, acidified milk formula (Pelargon), as well as to compare the rectal swab and stool method for determining pH.

CLINICAL MATERIAL AND METHODS

All subjects in this study were normal, full-term newborn infants. Three groups, each consisting of 40 infants, were observed. The same criteria were used in selecting each infant, and identical care, with the exception of the type of formula, was given in accordance with the established routine of the institution.

Group I received the acidified milk formula in a dilution of 2:3 (23 calories per ounce). No additional food or vitamins were given.

Group II received the acidified milk formula in a dilution of 1:3 (12 calories per ounce) for the first three days and, thereafter, in a standard dilution of 2:3. No additional food or vitamins were given.

Group III received an evaporated cow's milk and maltose-dextrin formula prepared in accordance with accepted infant feeding standards, that is, 12 calories per ounce for the first three days of life and 20 calories per ounce thereafter. A multiple vitamin preparation was started on the seventh day and continued throughout the study.

The infants in each of the 3 groups were observed for a minimum of four weeks. Their birth weights were comparable and statistically acceptable.

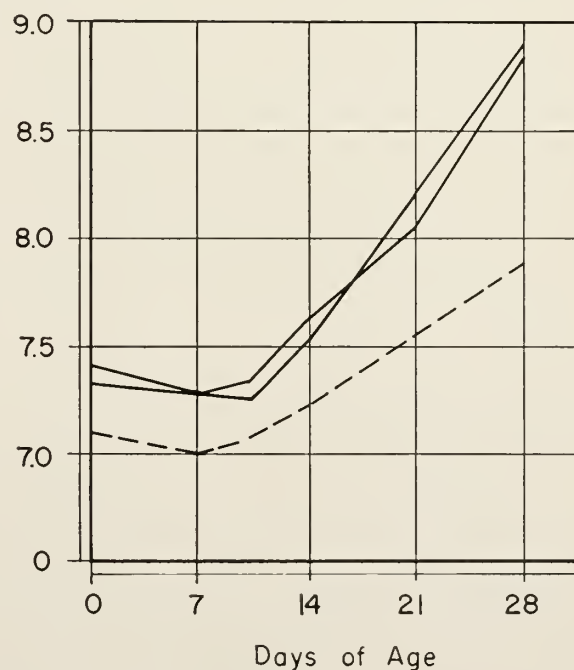
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The average number of stools per day and the consistency were recorded. The stool consistency was categorized into 3 groups: formed; pasty, soft, and semisoft; and semiliquid, liquid, and meconium.

The stool pH was recorded for each infant at varying age levels. A total of 528 stool pH determinations were made, with an average of 4.4 per infant. Material removed from the center portion of the stool, by means of a neutral applicator, was tested with nitrazine paper for the pH.

For purposes of comparison, a swab method was also employed. A sterile neutral swab dipped in distilled water was placed inside the rec-

Pounds



ACIDIFIED MILK —————
EVAPORATED MILK - - - - -

Fig. 1. Comparison of weight gain.

TABLE 1
NUMBER AND CONSISTENCY OF STOOLS

	Total	Average number of stools per day per child	Formed		Pasty, soft, semisoft		Semiliquid, Liquid, Meconium	
			Total	Per cent of total	Total	Per cent of total	Total	Per cent of total
1st Week								
Acidified milk	1,485	2.6	259	17.4	919	61.9	307	20.7
Evaporated milk	735	2.6	89	12.1	518	70.5	128	17.4
2nd Week								
Acidified milk	1,659	3.0	415	25.0	1,244	75.0	—	—
Evaporated milk	674	2.4	57	8.4	616	91.4	1	0.1
3rd Week								
Acidified milk	1,867	3.3	439	23.5	1,426	76.4	2	0.1
Evaporated milk	691	2.5	33	4.7	658	95.3	—	—
4th Week								
Acidified milk	1,786	3.2	405	22.6	1,380	77.3	1	0.1
Evaporated milk	626	2.2	44	7.0	575	91.9	7	1.1

tum and twisted along the rectal mucosa. The swab was then placed on a sterile, neutral slide with several drops of distilled water and tested with nitrazine paper for the pH.

RESULTS

Figure 1 illustrates the comparison of the weights of the infants in the 3 groups at the various age levels for which weights were recorded. At no time was there a significant weight difference between the infants in groups I and II. The weights of the infants in group III were similar until the second week, at which time the infants in the first 2 groups showed a slightly greater weight gain; this difference was more significant at the end of the third week and most significant at the end of the fourth week.

Because of an insignificant variation in weight, in subsequent comparisons, the infants in groups I and II, who were receiving the acidified milk dilutions, are presented as a combined group. The average number of stools per infant per day showed no significant variation despite the type of formula.

Table 1 compares the 2 groups of infants as to the average number of stools per day and their consistency by age group. Although no difference in the number of stools was noted, there was a difference in stool consistency. During the first week of life, 17.4 per cent of the stools of groups I and II were formed, compared to 12.1 per cent in group III. During the second week, 25 per cent of the stools were formed in groups I and II, and 8.4 per cent in group III. In the third week, the percentage of formed stools was 23.5 in groups I and II compared to 4.7 per cent for group III. In the fourth week, the percentage of formed stools in groups I and II was 22.6 compared to 7.0 per cent in group III.

The stool pH was determined for each child

at varying age levels. A total of 528 stool pH determinations were made with an average of 4.4 per infant. The average stool pH for the combined groups I and II and group III tended to increase over the period of observation. These changes are shown in table 2 and figure 2, where a trend has been fitted to the pH values for each group. The increase in pH was greatest in group III. The pH in all groups increased with age.

The pH was determined simultaneously by both stool and swab methods in 22 cases, the results of which are shown in table 3. In only 5 out of the 22 simultaneous determinations was the same pH value obtained by both methods.

TABLE 2
pH OF STOOLS ACCORDING TO INFANT'S AGE

Age in days	Groups I and II (Acidified milk)	Group III (Evaporated milk)
4	5.6	
5	5.5	5.0
6	5.3	5.7
7	5.5	5.7
8	5.5	6.5
9	5.8	5.7
10	5.6	6.1
11	6.1	6.3
12	5.9	6.2
13	6.0	6.2
14	5.9	6.6
15	5.9	6.5
16	5.9	6.6
17	5.9	7.0
18	6.0	6.4
19	5.8	6.6
20	6.1	7.3
21	6.0	6.9
22	6.1	6.6
23	6.0	6.8
24	6.0	7.5
25	6.1	7.2
26	5.9	7.0
27	6.1	6.9
28	6.3	6.9

pH Values

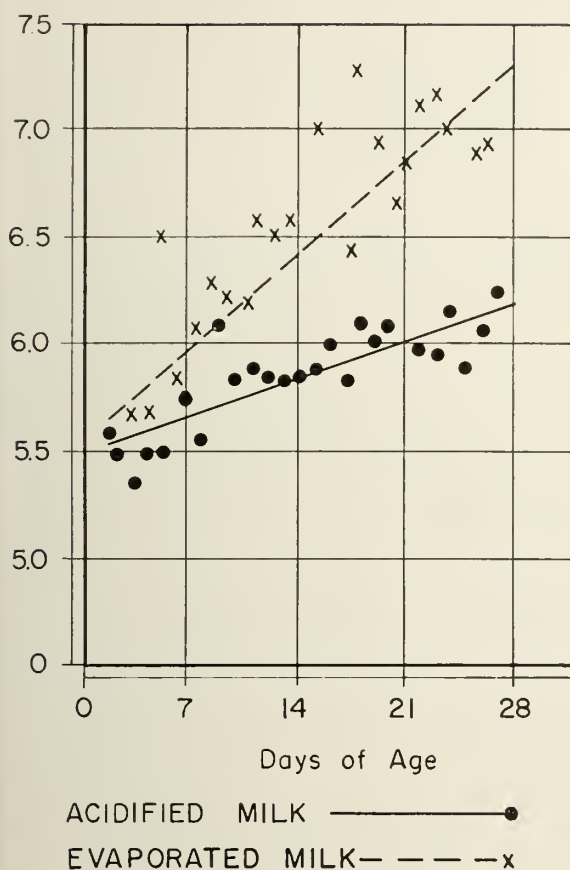


Fig. 2. Scattergram of 528 stool pH's.

DISCUSSION

The type of feeding directly affects the pH of the intestinal contents as well as its bacterial flora.¹ The percentage of gram-positive bacteria, especially *Lactobacillus bifidus*, in the intestinal contents is inversely proportional to the pH, and, conversely, the percentage of gram-negative bacteria is directly proportional to the pH.²

A recent study by Pratt and Read² of 251 newborn infants revealed that, irrespective of the type of feeding during the first three days of life, there is no appreciable difference in the stool pH. However, after the third day of life, there is a reduction of the stool pH in infants who are fed breast milk and a simulated breast milk product. But, an evaporated cow's milk formula, with maltose-dextrin added, does not appreciably lower the stool pH.

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TABLE 3
COMPARISON OF pH OBTAINED FROM THE STOOLS
WITH THE pH OBTAINED BY RECTAL SWAB

pH determined from Stool	pH determined from Rectal swab	Frequency of occurrence
5	6	1
5	6.5	1
5.5	6.5	5
5.5	7	1
5.5	7.5	1
6	6.5	3
6	7	3
6	7.5	2
7	7	2
7.5	7.5	3
Total 127.0	150.5	22

Recoagulation in the stomach is eliminated with the acidification of infant formulas.³ Therefore, larger quantities and greater concentrations of acidified formulas may be tolerated with less frequent gastrointestinal disturbances and a greater degree of digestibility. Thus, increased digestibility, absorption, and assimilation can be anticipated from a relatively smaller amount of acidified formulas than from nonacidified milk formulas.

SUMMARY AND CONCLUSIONS

1. The clinical response of 120 newborn infants fed a standard evaporated cow's milk formula and a powdered, modified, acidified milk formula was compared.

2. Beginning in the second week, the weights of the infants on the acidified formula began to rise faster than the weights of the group on evaporated milk. This rise continued and, by the fourth week, the average weight gain was significantly higher.

3. There was no significant difference between groups in the number of stools per day. The acidified milk group had a greater number of formed stools than the evaporated milk group.

4. Stool pH in all groups increased with age.

5. The stool pH in the acidified milk group was consistently lower than in the other group.

6. Two methods of obtaining pH were simultaneously compared, and it was found that skin or rectal pH values varied widely from the stool pH.

7. Although the skin-swab method resulted in higher pH values, correlation between the values obtained by the 2 methods was not significant.

Pelargon was supplied by the Nestle Co., Inc., White Plains, New York.

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The Acute Surgical Abdomen

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THE SURGEON must consider a great many conditions when he is to see a possible acute abdominal emergency case.

Medical conditions. He must first rule out the possibility of coronary thrombosis, pneumonia, mesenteric lymphadenitis, typhoid fever, gastroenteritis, ptomaine poisoning, and tabetic crises. Children in whom pneumonia is developing may complain of abdominal pain that closely simulates appendicitis. There may be no clinical or x-ray findings suggestive of pneumonia in the incipient stage, but usually the flushed cheeks and the use of accessory muscles of respiration point to the true condition.

Coronary disease may closely mimic cholecystitis and vice versa, or the two illnesses may even occur jointly. Pronounced localized tenderness and rigidity of the latter usually differentiate the two. Positive cholecystogram findings and electrocardiogram studies are also important aids in diagnosis.

Mesenteric lymphadenitis seen in children or young people is often difficult, if not impossible, to differentiate from appendicitis. In the former, symptoms are more apt to be bilateral, and rigidity is absent. Fever and leukocytosis may occur in both. Anorexia and nausea are more typical of appendicitis, as is the differential blood count.

Urologic lesions. The surgeon must rule out the possibility of pyelitis and of ureterolithiasis. Either can suggest appendicitis. The finding of pus in the urine, a high white blood cell count, and a high fever point to pyelitis, especially if there is lumbar tenderness. The pain in ureterolithiasis is more severe and agonizing and may be localized in the lumbar region or referred to the testicle or groin.

Gynecologic conditions. Tubal pregnancy, ruptured graafian follicle, strangulated ovarian cyst, salpingitis, and even pregnancy must be considered. A missed menstrual period followed by bleeding, localized tenderness, a palpable mass on the right or left side, and developing shock

point to a ruptured tubal pregnancy. "Mittelschmerz" occurs midway between periods and may be followed by mild symptoms suggestive of appendicitis. Rigidity is absent, and there may be no localized tenderness. The differential blood count does not indicate appendicitis. A strangulated ovarian cyst may be palpated and is usually accompanied by pain, more severe than in appendicitis. As in tubal pregnancy, the indication is for immediate surgery. Salpingitis generally causes bilateral pain and tenderness with typical symptoms and history if specific. Even the best surgeons have been known to make the mistake of operating on pregnant patients, believing some other condition was present. I once operated upon a pregnant woman which was not a mistake; she had an abdominal pregnancy.

After carefully eliminating these conditions from possible acute surgical lesions of the abdomen, the latter must then be considered. The diagnosis may not be difficult to determine, or, as so often is the case, the true condition may not be ascertained until the abdomen is opened. Experience is invaluable, but the most astute diagnostician is often confused by a picture that differs markedly from the textbook description. On opening the abdomen, innumerable conditions may be encountered, such as an intestinal obstruction due to gallstone, a mass that proves to be a mucocele of the appendix, gangrenous torsion of the omentum, intussusception, volvulus, pancreatitis, perforated Meckel's diverticulum, hemorrhage from a leiomyoma, abdominal aneurysm, a chicken bone causing perforation of the bowel, a ruptured spleen, and many other unexpected lesions.

The surgeon must first decide whether he is dealing with an acute surgical abdomen and, if so, whether immediate surgery is indicated or whether the patient's condition must be improved by a short period of preparation with intravenous fluids, blood transfusions, gastric suction, and other procedures.

Next, the choice of anesthesia must be considered. Since 1928, I have used spinal anesthesia in all cases with the exception of very young children. My preference for spinal over

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inhalation or any type of general anesthesia has been recently stated in a review of 10,000 cases reported in the February 1955 issue of the *Journal of the International College of Surgeons*. Briefly, I feel spinal anesthesia affords maximum abdominal relaxation, thereby greatly facilitating the operation. There is less shock, and there are fewer postoperative complications and a quicker convalescence.

Then the surgeon must attempt to localize the trouble in order to properly place the incision. The most frequent lesions occurring in the upper abdomen are perforated ulcer, pancreatitis, and cholecystitis.

Perforated ulcer is suggested by a history of recurring spells of epigastric pain on an empty stomach which is relieved by eating. Then there is a sudden onset of terrific pain simulating a gunshot. The patient breaks out in sweat, is unable to lie down, and soon board-like rigidity and prostration develop. At first, the temperature and blood count are normal, but they increase as peritonitis develops. A flat roentgenogram may show a gas bubble under the diaphragm. The sooner surgery is performed, the better. Most surgeons prefer to close the perforation and close the incision without drainage. Some advocate gastric resection, if conditions permit.

Acute cholecystitis usually presents a typical picture of gradually developing colicky pain in the right upper quadrant radiating along the right costal margin. This is usually accompanied by nausea, vomiting, fever, and a high white blood cell count. Tenderness is localized and typical. Surgeons differ as to when to operate. If the temperature and blood count decrease and the patient improves, I prefer to delay surgery a few days; otherwise, I operate at once. If the patient is elderly and a poor risk, a cholecystostomy is performed. All cases are drained.

If *acute pancreatitis* can be diagnosed clinically, it may be preferable to treat the case medically. A gradual onset of rather severe epigastric pain accompanied by vomiting, a high fever, and a high leukocyte count is followed by prostration. A high serum amylase test suggests acute pancreatitis. Symptomatic measures may suffice; sympathectomy may help and likewise antibiotics. I have, on occasion, operated and, finding a severe pancreatitis, have done a cholecystostomy removing gallstones and draining the common duct.

In the middle and lower abdomen, a multiplicity of acute abdominal emergencies may occur. Of these, appendicitis is the most frequent and one that still causes too many complications

and even death, despite the greatly reduced mortality through the use of the sulfa drugs and antibiotics.

A retrocecal gangrenous appendix can be deceptive. The blood count and temperature may be normal; there may be only slight tenderness and rigidity. When in doubt, it is better to explore. In these cases, turning the patient on his left side and palpating at the end of expiration may elicit tenderness and, with the aid of the differential blood count, clarify the diagnosis.

In 1946, I advocated nondrainage and early ambulation in the treatment of perforated appendicitis with peritonitis. In these cases, I have lavaged the peritoneal cavity with 10 gm. of sulfathiazole powder in half a pint of saline solution. With the advent of antibiotics, penicillin and streptomycin have been added but with no change in results. No deaths have occurred and no wounds have become infected during this ten-year period.

Intestinal obstruction still carries a high mortality. Its many causes, such as intussusception, volvulus, strangulated hernia, malignancy, adhesions, gallstones, and congenital anomalies, may be puzzling to diagnose. With a high obstruction, crampy pains, early and repeated vomiting, and visible abdominal peristalsis may point to the condition, especially if due to adhesions from previous surgery. If the obstruction is from malignancy in the descending colon, the abdomen may be generally distended, there may be complete obstipation, and vomiting is absent or delayed. The temperature and blood counts are normal at first, onset is gradual, and the roentgenogram usually shows the source of the trouble.

The important thing in acute intestinal obstruction is to operate and relieve the condition as early as possible. In some instances, surgery must be delayed a few hours to better prepare the patient with gastric suction and intravenous fluids.

Congenital anomalies may lead to various acute surgical abdominal lesions. Of these, the most frequent are due to Meckel's diverticulum, which may cause perforation, obstruction, and hemorrhage. On exploring the abdomen, search should always be made for this anomaly.

If an elderly or middle-aged person is admitted complaining of a generalized abdominal pain and if examination of the heart reveals that it is irregular or fibrillating, mesenteric thrombosis must be considered. This is a probability if there is a history of rectal bleeding and if the abdomen has a doughy feeling. If exploration reveals this condition, intravenous heparin should be administered, the gangrenous bowel resected, and Di-

cumarol started orally. Few patients survive, but not all die.

A perforated diverticulum of the sigmoid is not uncommon and may not be easy to diagnose. It usually results in a localized peritonitis and is preferably treated medically. Later, the extent of the disease may be determined by x-ray studies, and a resection of part of the diseased colon may be deemed necessary.

Time and space do not permit a discussion of the large group of traumatic abdominal emergencies, such as ruptured spleen, liver, or bowel, but a good rule to follow is that, when in doubt, operate. Better an occasional negative exploration than a fatal case of peritonitis or hemorrhage.

Nor is it possible in this discussion to consider the large group of conditions causing gastrointestinal hemorrhage. In my own experience, nearly all of these cases have not been treated as surgical emergencies but have been treated medically and operated upon after the hemorrhage was controlled.

Other uncommon entities, such as torsion of the omentum and ruptured abdominal aneurysm, must be considered as rare possibilities, but gen-

erally the condition to be found will be among those discussed.

The abdomen should not be opened unless the surgeon has in mind all these possibilities and is prepared to perform the operation demanded. What might seem to require a simple appendectomy may necessitate a difficult bowel resection. The acute surgical abdomen is a constant challenge to the surgeon, not only as a test of his diagnostic ability but also as a test of his skill and ingenuity as an operator under unusual and unfamiliar circumstances.

SUMMARY

Medical conditions simulating acute abdominal surgical lesions are discussed.

Urologic and gynecologic problems are conditions that must also be considered.

Surgical problems occurring in the upper abdomen are cholecystitis, pancreatitis, and perforated ulcer. Their symptomatology and surgical treatment are briefly reviewed.

The most important surgical emergencies occurring in the middle and lower abdomen are discussed and the author's preference of anesthesia and methods of treatment are stated.

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IN HEMOPHILIA, bleeding into and about the central nervous system is a rare, but extremely serious, complication. If treatment is withheld, the first hemorrhage is fatal to more than 75 per cent of patients.

Hemorrhage in the brain usually occurs in the frontal lobes of the cerebrum, but hematomas formed by cerebral bleeding may press upon the brain stem. Only 1 instance of midbrain bleeding has been observed and none of cerebellar hemorrhage. Spinal cord hemorrhages are usually caused by trauma and often improve without treatment. Hemorrhage into the peripheral nerves usually resolves spontaneously.

Surgical treatment for central nervous system lesions in hemophilic patients consists of excision or repair of the lesion and conversion of the operative site into an open wound, which can be firmly packed to prevent further bleeding and permitted to heal by second intention.

Local application of antihemophilic globulin fractions may be efficacious. Electrocautery is sometimes of value; however, late hemorrhage may result when necrotic fragments of tissue are sloughed. Local cooling causes vasoconstriction, thus promoting closure of traumatized vessels.

R. K. JONES, M.D., and R. S. KNIGHTON, M.D. (Henry Ford Hospital, Detroit): *Ann. Surg.* 144: 1029-1034, 1956.

Premenstrual Tension in Psychotic Women

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THIS REPORT includes observations on 271 mentally ill women and records the physical findings, behavior changes, and alterations in fluid, electrolyte, and other metabolic processes as they relate to the emotional disturbance and especially as they pertain to different phases of the ovarian cycle. The treatment method is outlined, and preliminary results are reported. Discussion is directed toward a better understanding of the mechanism of the physiologic and psychologic processes as observed and used in treatment. The physiologic aspects are emphasized, not with the intent of minimizing the psychologic, but to stress the importance of both in understanding and treating mental illness.

There are factors that warrant mention to avoid misinterpretation. The broad scope of the study, necessitating generalization and the importance of brevity, tends to obscure the value and validity of findings. Many phases of the project are objective; some are, of necessity, subjective. The conclusions reached were with these factors considered. The results are highly encouraging and warrant further consideration. Subsequent reports intend to eliminate some of the limiting factors.

MATERIAL INCLUDED IN THE STUDY

Of the 271 women who entered the hospital as mentally ill, 54 were at one time confined to the maximum security ward for patients with suicidal tendencies, negativistic behavior, and assaultive tendencies. These patients had been hospitalized for at least two years. Of the remainder, 52 patients were in the hospital at the start of the study and 165 were admitted subsequently. Age range and diagnosis for the total group are given in table 1.

METHOD OF EVALUATION

Examination on admission. In addition to recording histories, the eyes, genital organs, and teeth were examined. The psychiatric examination included a check of the patients' mental status and psychometric evaluation.

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The laboratory work-up included a routine blood and urine analysis, roentgenograms of the chest and spine, and, if indicated, an electrocardiogram and an electroencephalogram. Fasting blood glucose and tolerance determinations were made in some of the patients.

Evaluation in the hospital. 1. Each patient was seen daily by the physician, and a periodic check was made of the mental status at the peak of a stress period and again during the "lucid phase" of the menstrual cycle.

2. A careful record was kept of the date of onset of menstruation and of the patient's weight, which was recorded every second day shortly after arising. Behavior charts were made with quantitative evaluations of improvement, including social adjustment and recreational activities, work, ward behavior, and personal habits.

3. A day-to-day report was transcribed by the aides, recording all physical signs and behavior changes indicating either an improvement or a regression. This was handed to the physician for proper evaluation.

4. The patients' progress was reported periodically during their hospital stay as: improved, unimproved, or markedly improved. At the time of discharge, the adjustment was rated as: poor, satisfactory, or highly satisfactory. Other criteria of improvement were the duration of the period of lucidity, recurrence of psychotic symptoms, and the length of the period of stress.

The status of each patient prior to discharge was evaluated by a physician and by a psychologist. Return visits to the hospital for follow-up care were encouraged.

METHOD OF TREATMENT

The treatment was directed toward the total psychobiologic unit through the use of a "Major Prescription."¹ This contained the treatment that the physician had ordered for each patient and covered twenty-four hours of each day, as best suited for effecting the desired behavior change. All available means were utilized to treat the total personality, including all the recommended psychiatric treatments, that is, electroconvulsive, insulin coma, occupational, recreational, and in-

TABLE 1
AGE AND DIAGNOSIS OF STUDY GROUP

	Age 10 to 20	Age 20 to 30	Age 30 to 40	Age 40 to 50	Total
Schizophrenia					
Paranoid	3	5	25	28	61
Hebephrenic	7	13	13	5	38
Catatonic	0	2	8	3	13
Simple	0	4	4	0	8
Schizoaffective	0	5	12	8	25
Affective disorder	1	4	7	4	16
Depressed reaction	1	13	13	14	41
Psychoneurosis	0	11	7	5	23
Involucional				15	15
Mental defective	3	3	1	2	9
Epileptic	0	3	2	1	6
Postencephalitic	0	1	0	2	3
Paranoid state	0	0	3	3	6
Organic involvement	0	2	5	0	7
Total	15	66	100	90	271

dustrial therapy; religious counseling; group and individual psychotherapy; and family counseling. These measures and medication were used in whatever combination the doctor felt would give maximum benefit. Also incorporated in the "Major Prescription" were measures directed against manifestations of premenstrual tension, fatigue, malnutrition, dehydration, and electrolyte imbalance.^{2,3} The individual psychotherapy and group counseling measures were thus directed against the emotional stress itself, while the medication content of the "Prescription" attempted to overcome the effect of this stress by correcting autonomic, metabolic, and other imbalances.

Treatment was based on the patient's history and physical, neurologic, psychiatric, and laboratory findings and then adapted to the individual response.

The acutely psychotic or severely depressed individual who was not eating or resting well and was not amenable to psychotherapy initially was given parenteral fluids with electrolytes and nutrients and adequate sedation to insure good relaxation during the administration of fluids. Parenteral fluids and sedation were not given to those who were less acutely ill.³

A daily program was instituted for each patient at the earliest possible time. This program included moderate but increasing physical activity, industrial therapy, occupational therapy, and participation in social and recreational affairs. Important aspects were an early interview to explain the treatment to the patient and the formulation of a regular program aiming to make the patient feel again like an individual. The latter included wearing their own clothes and

encouraging and helping them in matters of personal hygiene.

Medication was prescribed when symptoms were of sufficient severity to impair the therapy program. It was prescribed daily and was based on presenting symptoms and for alleviation of the stress reaction. Dosages were prescribed on the basis of their effectiveness in relieving the symptoms and were reduced or discontinued at the earliest feasible time.

The measures directed toward lessening the distress from premenstrual tension included both the psychologic and physiologic approach. The latter employed medication, including testosterone propionate, for its antidepressant and anabolic characteristics. The dosage was usually 50 and never exceeded 300 mg. for each thirty-day period. Occasionally, a second course of 50 to 200 mg. was necessary.³

In the many instances in which fluid retention was a factor, diuretics and other medications were used to neutralize the excessive premenstrual activity of the antidiuretic hormone.⁴ In these cases, effective use was made of the relatively new diuretic, Pamabrom (2-amino-2-methyl-propanol-1-8 bromothéophyllinate). It was given orally in the premenstrual and menstrual periods and did not seem to create drug fastness. Its long-term use is safe.⁵ Dosage was usually 1 tablet four times each day. Pamabrom was administered when fluid retention appeared or, preferably, when first suspected. It was given during each menstrual cycle until improvement occurred and then was gradually discontinued.

Individual counseling and group discussions dealt with problems associated with premenstrual tension, emotional stress, and mental ill-

ness. The objective was to give the patients a better understanding of the nature of their difficulties and the method used for their alleviation. Family members, and especially husbands, were invited to attend some of the informal group discussions. Their understanding of emotional outbursts helped to prevent these occurrences and seemed to relieve some of the stress experienced by the patient. Some of the women confessed to a feeling of guilt after an emotional outburst, especially in the presence of friends or family members who lacked understanding of this phase of the problem.

Upon their discharge, many patients were encouraged to return to the hospital and attend group therapy programs as part of follow-up care.

RELATION BETWEEN CYCLIC, WEIGHT, AND
PSYCHOLOGIC STATES

Incidence. Of the 271 women in the study between the ages of 14 and 50, 216 were menstruating and showed definite cyclic variations in behavior which were in close correlation with the periodicity of the menstrual cycle as a whole. There were 25 patients of the total group who were menstruating, although a cycle could not be established because of inadequate history or length of study. There were 30 patients who did not menstruate during the period of study. Of the 30, there were 21 who had continued cycles of behavior change which corresponded to the assumed ovarian cycle. Of these, 6 did not menstruate because of hysterectomy, 6 others because of the menopause, and 9 were diagnosed as cases of functional amenorrhea since they were less than 40 years of age. There were 4 who did not show evidence of a cycle, 2 had had hysterectomies, and the other 2 were past the menopause. The remaining 5 were patients in whom the condition was such that evaluation was not feasible. It was noteworthy that the typical premenstrual tension syndrome continued even when menstruation was absent (table 2).

Clinical conditions during stress period. A high incidence of suicidal attempts, assaults, escapes, hallucinations, delusions, and illusions occurred predominantly during the tension period. Table 3 shows that all of the 12 suicidal attempts made by 6 patients occurred during the postovulatory phase. In another group of 4 patients who experienced a total number of 23 grand mal convulsions, 22 occurred in the post-ovulatory period. In 9 patients who had complicating disorders such as bronchial asthma, allergic dermatitis, psoriasis, and lupus erythematosus, the condition was in every instance in-

tensified during the stress phase of the ovulatory cycle. A significant number of patients also experienced an attack of facial blemishes, such as acne, during the period.

Laboratory findings. A number of the laboratory findings were not exactly significant but still worthy of mention. For example, among the electroencephalogram determinations made on 12 patients, each had normal readings and at least one which was abnormal, and the latter was in every instance made during the postovulatory period of the menstrual cycle. In another group of 6 patients who were given glucose tolerance tests, the findings were the same; that is, the abnormal reading which occurred at least once in each individual was made during the stress period, and the normal one was made during the preovulatory phase.

Weight Change. In a group of 15 patients, confined to the maximum security ward, whose weight was checked every day for a period of three or more months, symptoms of behavior change frequently did not start until the weight increase had almost reached its maximum limit. Two significant weight increases occurred consistently during each cycle. The first and more sizable one appeared premenstrually and during menstruation and lasted three to ten days. The

TABLE 2
CATAMENIA AND PREMENSTRUAL TENSION SYMPTOMS

	No. patients
<i>Menstruating:</i>	
14 to 40 years with premenstrual tension	166
40 to 50 years with premenstrual tension	50
Insufficient history	25
<i>Not menstruating:</i>	
With premenstrual tension symptoms	
after hysterectomy	6
menopausal	6
functional	9
Without premenstrual tension symptoms	
after hysterectomy	2
menopausal	2
miscellaneous	5
Total	271

TABLE 3
COMPARISON OF ASSAULTIVE BEHAVIOR, SUICIDAL ATTEMPTS, AND GRAND MAL CONVULSIONS DURING THE PREOVULATORY AND POSTOVULATORY PHASES OF THE MENSTRUAL CYCLE

	No. patients	Pre-ovulatory phase	Post-ovulatory phase
Assaultive	20	16	184
Suicidal attempts	6	0	12
Seizure	4	1	22

TABLE 4
WEIGHT CHANGES DURING OVULATORY CYCLE

No. patients	Type	Average weight		Ovulation	Average weight gain Premenstrual
		Minimum	Maximum		
25	Convalescent	136 lb.	141½ lb.	3½ lb.	5½ lb.
25	Agitated	136 lb.	144 lb.		8 lb.
15	Picked at random	123 lb.	131½ lb.	3¾ lb.*	8½ lb.**

*Average duration, 4 days; **average duration, 7 days.

second usually took place one or two days after the calculated date of ovulation and lasted two to four days.

Similar findings associated with weight increases were observed in a group of convalescent patients. Thus, among 25 whose weight was determined for at least two months, 21 had a weight curve similar to the one described, their average gain being 5½ lb. for the premenstrual phase and 3½ lb. for the ovulatory period (table 4). The other 4 individuals had a weight increase only during the premenstrual phase. Another group of 25 patients who were less improved were observed for at least two months. They became agitated, delusional, or displayed manifestations of psychotic behavior at these same periods and showed similar weight increases. The average increase amounted to 8 lb. for the period of premenstrual tension. The average duration of this increase was one to two days longer for the ovulatory and two to four days longer for the premenstrual tension periods than was the case in the more improved group.

Adolescent and menopausal changes. There were 8 adolescent patients whose menstrual flow was very erratic combined with a pronounced and long-lasting change in weight during each cycle. A similar situation was found in many of the women in the menopausal age range. They frequently complained of associated puffiness of the face and extremities, indicative of extra weight gain. The weight changes of the menopausal women were cyclic and corresponded to the periodicity of the ovarian cycle. Four of the women over 50 years of age and not initially included in the study displayed changes in behavior and weight that corresponded to the ovarian cycle. No definite increases in weight corresponding to the calculated date of ovulation could be detected.

There were 8 women with amenorrhea; 4 were functional cases, and 4 were caused by hysterectomies. All had weight changes similar to those who were menstruating. In 2 patients with functional amenorrhea, the weight remained almost constant at first and then, as improvement set in, the typical double-peak weight curve developed.

Lucid period. The consistent occurrence of a lucid interval midway between the onset of the menses and the calculated date of ovulation greatly facilitated outlining the treatment. The interval varied in length, lasting at times only one or two days and at other times throughout the cycle, but there was a consistent increase in duration while the patient was improving. In many individuals, the menstrual flow started one or two days after the premenstrual weight peak began to drop again. In a number of other patients with a similar weight curve, the menstrual flow started at the time of the initial premenstrual weight increase. Quite commonly, the weight gain continued after the menstrual flow had stopped. In 2 instances, the flow continued seven to twelve days, that is, up to the time the fall in weight set in. In 2 other women, the tension and weight increase started on the last two days of the cycle and, occasionally, after cessation of the flow.

The careful correlation of the date of onset of the menstrual flow with changes in weight proved that the weight curve was a reliable guide for determining the ovulatory cycle and the date of ovulation. The same curve also proved a sensitive indicator for judging the patient's progress, in addition to being helpful in directing the treatment. The weight increase preceded the onset of psychotic behavior by twelve to twenty-four hours, while improvement which followed twelve to twenty-four hours after the weight gain was not followed by a significant change in the behavior pattern until an instance of irritation occurred; the change then was sudden and continuous. The irritation was often of a minor nature.

RESULTS OF TREATMENT

The merit of the therapy was attested by a reduction in accidents, injuries, and assaultive manifestations as well as by general improvement in ward behavior. Still other indications were an increased social response and ability to assume many responsibilities in the hospital, such as conducting tours, participating in panel discussions before members of the P.T.A., working in the ward, and taking part in group ac-

tivities of 30 to 60 patients — all activities which heretofore were believed impossible for these patients.

The better understanding these patients gain of their illness makes them feel like “experts” on the subject. Another criterion for evaluation is the ease with which new patients can be incorporated into group programs a few days after their admission and the readiness of those who have been discharged to return to their “alma mater” for a visit to tell of the surprise registered by friends and physicians at their improvement.

Fluid, testosterone, and Pamabrom therapy. Twenty-one acutely psychotic women were subjected to a regimen of parenteral fluids, testosterone, and Pamabrom therapy. All had at some time previously received systemic and other indicated treatment with poor results. This time all members of the group improved, and their sensorium cleared within seven days after the start of the therapy. All the patients were subsequently discharged from the hospital. Their adjustment without remissions lasted variously from three to twenty-four months.

At the time of writing, 23 patients who had received fluid therapy, testosterone, and Pamabrom were still hospitalized; 12 of them had sufficiently improved to be considered for discharge; 8 others showed improvement, but in 3, this was not sustained. Of these 3 patients, 1 recently had 2 lobes of her lungs removed and continued to suffer from bronchiectasis. The 3 remaining patients of this group of 23 did not show detectable improvement; 2 of them had a convulsive disorder, and the other was mentally defective.

Fluid, testosterone, Pamabrom, and E.C.T. therapy. Twenty-one patients received both fluid therapy and 2 to 4 electroshock treatments simultaneously. Eighteen improved markedly and were lucid by the fifth day after the start of treatment; they remained so until discharged from the hospital. Two patients who had similarly responded suffered a relapse premenstrually the following month, which lasted for several days. In both patients, the sensorium cleared shortly after the onset of menstruation, and both received Pamabrom and testosterone propionate at the inception of symptoms. In another patient, the sensorium cleared in five days but depression continued for several weeks. However, all 21 patients improved sufficiently for subsequent discharge from the hospital (table 5).

Testosterone and Pamabrom therapy. Forty-one patients who were treated with testosterone

and Pamabrom, as recommended, also received other therapy (not E.C.T. or I.S.T.). The pertinent data relating to these cases are listed in table 6. The efficacy of individual psychotherapy applied shortly after the thinking began to clear was remarkable. Early participation in physical activities and industrial therapy was deemed highly beneficial. Therefore, a carefully planned daily program of this nature was instituted as soon as the patient became ambulatory. Continued improvement followed, inasmuch as the symptoms during the premenstrual phases were much milder and could more readily be controlled by use of Pamabrom and psychotherapy.

Some received Pamabrom and no other medication or somatic treatment. The results are tabulated in table 6.

There were 3 patients in whom the “total push” was not immediately applied, and, in each, the psychotic symptoms recurred. However, these symptoms did yield subsequently to this therapy.

DISCUSSION

The group of psychotic women carefully observed and studied by us revealed findings similar to those associated with premenstrual tension. The changes in behavior and in the physical findings, including gain in weight, which were seen during ovulation and in the premenstrual phase of the ovarian cycle, suggested the presence of a similar mechanism in both psychotic patients and in nonpsychotic women with premenstrual tension. Studies made by other investigators on nonpsychotic women with premenstrual tension have revealed the presence of an abnormal carbohydrate and protein metabolism as well as other imbalances. More recent determinations of adrenocortical activity and fluid and electrolyte balance in schizophrenic patients have shown that these factors play an important

TABLE 5
TOTAL NUMBER E.C.T. GIVEN FOR ONE MONTH

	No. of patients	No. of treatments
Before onset of study	66	258
One year after onset of study	21	76
Two years after onset of study	4	15

DURATION OF AGITATED AND DISTURBED PERIODS

	No. of patients	No. of disturbed	No. of accidents
Before onset of study	52	239	121
One year after onset	43	134	72
Two years after onset	31	81	23

Disturbed or agitated included severe depression, escapes, negativistic behavior, and so forth.

TABLE 6
RESULTS OF TREATMENT

No. patients	Diagnosis	No. discharged	Markedly improved	Moderately improved	Slightly improved	Unimproved	Previous E.C.T.	unsuccessful Insulin	treatment Lobotomy
PAMABROM									
10	Schizophrenia	4	2	3	1	—	—	—	—
10	Psychoneurosis	6	2	2	—	—	—	—	—
PAMABROM AND TESTOSTERONE									
20	Schizophrenia	6	5	6	2	1	14	2	—
4	Affective disorder	1	1	1	1	—	3	—	—
17	Psychoneurosis	13	2	2	—	—	—	—	—
FLUID, PAMABROM, AND TESTOSTERONE									
39	Schizophrenia	20	12	6	1	—	36	19	4
3	Affective disorder	1	1	1	—	—	—	—	—
1	Mental defect	—	—	—	—	1	1	—	—
1	Convulsive disorder	—	—	—	—	1	1	—	1
FLUID, PAMABROM, TESTOSTERONE, AND E.C.T.									
14	Schizophrenia	14	—	—	—	—	8	3	—
2	Affective disorder	2	—	—	—	—	3	—	—
3	Invol. dep.	3	—	—	—	—	—	—	—
2	Psychoneurosis	2	—	—	—	—	—	—	—
E.C.T.									
32	Schizophrenia	5	4	6	7	10	—	—	—
10	Affective disorder	4	2	2	2	—	—	—	—
4	Organic disorder	1	—	—	—	3	—	—	—
33	Psychoneurosis	15	6	4	3	5	—	—	—
INSULIN									
12	Schizophrenia	6	2	1	1	2	—	—	—
INSULIN AND E.C.T.									
25	Schizophrenia	7	4	5	4	5	—	—	—

role in the manifestations of mental illness.^{2,6-8} It would appear, therefore, that physiologic and biochemical processes must be duly considered in the treatment of both primary psychoneurosis and psychosis.

Regulation of protein and carbohydrate metabolism and of the fluid and electrolyte balance is ordinarily hormonal in nature and is mediated primarily through the adrenal cortex and the pituitary. Overactivity of the adrenal cortex results in sodium and water retention; cellular loss of nitrogen and potassium initially increases and then decreases tolerance to carbohydrate. This type of reaction results in changes that are referred to as catabolic or adrenergic.⁹

The water balance is also regulated through the antidiuretic hormone, which is secreted by the posterior pituitary gland; the latter is thought to be controlled by the hypothalamus. Both emotional and physical stress reactions bring about increased fluid retention accompanied by increased blood levels of the antidiuretic hormone. This shows that, during stress, fluid retention is mediated through secretion of the antidiuretic hormone. The fluid retained is predominantly extracellular and could, therefore, contribute to the development of a relative deficiency of cellular potassium.¹⁰

Metabolic changes described as catabolic or adrenergic and some psychotic reactions associated with mental illness have been reported to occur in the premenstrual tension syndrome. The metabolic changes which have been reported in emotionally stable individuals and experimental animals subjected to stress strongly indicate that these changes are the result of increased activity of the adrenal cortex, for the blood level of corticosteroids was significantly elevated in all of these cases. The stress reactions were induced by lack of sleep, physical exertion, anxiety, exposure to cold or heat, fluid deprivation or excess fluid intake, and electroconvulsive treatment or insulin coma.¹¹⁻¹³

The mechanism of the reaction to stress can be readily understood on the basis of Selye's alarm reaction. It implies that emotional or other types of stress resulting in activity of the autonomic nervous system produces a stimulation of the anterior pituitary gland through the hypothalamus. This stimulation induces, in turn, an increased liberation of adrenocorticotrophin, which activates the output of corticoid hormones by the adrenal cortex. The relative excess production of the latter hormones causes the changes in metabolism described above.¹⁴

Although the increase in stress which occurs

in the premenstrual and presumed ovulatory periods is not entirely understood, evidence indicates that the hormonal changes which take place during the ovarian cycle are mediated through the pituitary-adrenal axis and are responsible for the stress reaction.²

It is known that estrogen can cause an alarm reaction when injected into animals. If it were possible to elicit the same response in women, it would explain the physiologic changes which occur during the premenstrual stress phase of the ovarian cycle.² The stress reaction associated with the ovarian cycle is thought to be enhanced or accentuated by environmental influences, such as marital difficulties and economic, religious, or other types of emotional problems. When the emotional strain becomes sufficiently severe, the mechanism of the general adaptation syndrome (Selye) could cause disturbances in fluid and electrolyte balance sufficient to produce an actual or relative potassium deficiency and the symptoms associated therewith.^{2,14,15} Fatigue, faulty eating habits, and all the concomitants of anxiety and depression add to the stress reactions and tend to perpetuate them. Other sources of stress are an increase in certain catabolic processes in psychosis, which augment nutritional needs, and poor nutrition caused by withdrawal.

It is unlikely that the abnormal homeostasis which results from the impaired regulation of the endocrine and autonomic nervous systems can be restored to normal unless the precipitating stress situation is first corrected and associated or complicating stress factors are sought out and eliminated.

The chronically ill individual presents problems quite different from the acutely ill person. In the former, response to stress is poor, adrenal activity is considered normal, and so is the reaction to stress. However, the autonomic nervous system, as shown by the Funkenstein test, is found to be hypoactive and hyporeactive—a finding also present in other chronic or debilitating illnesses. The patient's aloof attitude and protracted inactivity with failure to face situations as they arise lead to "atrophy" and "hyporeactive" tissue through "disuse." There is also evidence which suggests that nutritional factors may modify the type and quantity of anterior pituitary hormone secretion. Consequently, the state of actual or relative malnutrition and the spread of "hyporeactive" tissue to muscles, endocrine glands, and nerves decrease the ability of these organs to cope adequately with severe and prolonged stress situations. Thus, for treatment to be effective, it must include restoration of the tissues to normal physiologic reactivity. This can

be done by supplying the factors which are deficient, removing those which are in excess or detrimental, and by repeated use of stimuli of increasing intensity to restore the normal margin of reactivity.

The close correlation between the changes in behavior and in body weight of the women studied strongly suggested the importance of physiologic factors both from the standpoint of diagnosis and of treatment. Considerable evidence indicates that many symptoms of psychosis are secondary to physiologic changes which are themselves the result of the individual's inability to cope with emotional stress. Thus, symptoms may arise from emotional stress and also from physiologic changes irrespective of stress. Treatment should be directed toward both types of symptoms as well as to the associated symptoms previously mentioned.

The treatment used can best be described as consisting of two phases. The aim of the first phase is to restore the normal state of homeostasis; the objective of the second phase is to maintain it at the normal level. The treatment usually encompasses both phases simultaneously by starting at the level of the cell and then integrating the functions of each into a normal functioning psychobiologic unit. Parenteral fluids, electrolytes, and nutrients are given in adequate amounts to insure the supply of constituents necessary to shift the equilibrium at the cell level back to normal.

Testosterone was used because of its reported effect on anabolic changes and its metabolic influence on the pituitary-adrenal mechanism. Pamabrom was employed for its reported effect on the antidiuretic hormone. The over-all purpose behind both medications was to inhibit or reverse the untoward impact of stress reactions until the individual was able to cope with them.

The autonomous nervous system and hypothalamus were in part regulated by means of medication prescribed to orient the system in the direction necessary to establish homeostasis. Medication was selected to stimulate or inhibit, as necessary, both the adrenergic and the cholinergic systems in a manner that adequately met the needs of the individual patient.

The second phase of the treatment utilized the "total push" technic, including careful daily programming. This was in addition to therapy directed toward the underlying psychopathology. The aim of the "total push" technic is to increase the ability of the individual to cope with his daily physical needs and to aid in the satisfactory sublimation of emotional problems. Accomplishment of this goal should so improve the function of

the neuro-endocrine system that stress situations are more adequately alleviated by improvement of their physiologic reactivity, thereby increasing adaptability to stress.

Selye's concept that disease represents an effort on the part of the organism to adapt itself to stress makes for a better understanding of mental illness and its treatment. According to this concept, man is in a state of continued equilibrium and is striving to adjust or adapt himself to the stress from without and the strain from within. Psychoneuroses and psychoses are thus regarded as attempts to adapt to psychologic stress. This is made possible through the defense mechanism of the ego. Untoward physiologic symptoms result if the adaptive functions are disturbed or break down.

The aim of therapy should be to maintain and strengthen the various defense mechanisms and reactions of the ego which make adaptation possible. If this goal is achieved through education, training, and psychotherapy, it will result in a way of life which is compatible with the individual's needs and the exigencies of the environment. This is made possible through employment of different therapeutic measures, including those which endeavor to restore and maintain the physiologic homeostasis.

SUMMARY

A better understanding of the manifestations of mental illness has resulted from observations of the cyclic nature of physical changes and of emotional behavior and their relation to the ovarian cycle.

All of the 237 individuals (216 menstruating and 21 amenorrheic) thus observed showed definite cyclic behavior changes which corresponded to the periodicity of the ovarian cycle. It was not possible to determine the presence of such changes in 25 other women because of inadequate data. The remaining 9 were amenorrheic, and cycles were not noted in these women.

Out of 200 instances of assaultive and violent

behavior, 184 occurred during the premenstrual tension period. Noteworthy is the fact that cyclic behavior changes of the premenstrual tension type may persist in the absence of menstruation.

Another striking parallelism between behavior changes and the ovarian cycle was a weight increase due to fluid retention. In many instances, 2 significant weight increases were clearly discernible during each cycle. The greater increase occurred premenstrually and menstrually over a period of three to ten days, and the second or lesser increase usually occurred one or two days after the calculated ovulation date and lasted two to four days. In some of the women, the behavior change and weight increase took place during the menses, and, in 2, postmenstrually.

The weight curve proved to be a sensitive indicator of the progress made by each individual and was very helpful in directing the treatment. The weight increase preceded its subsequent drop by twelve to twenty-four hours.

Treatment was directed at the total psychobiologic unit and was applied in the form of a "Major Prescription." This included, in addition to the recommended psychotherapy, due consideration of physiologic functions, fluid and electrolyte balances, and metabolic processes which play an important part in the changes brought about by stress situations. The mechanism of the general adaptation syndrome was of value in the treatment because of the compensatory mechanisms which are present in the hypothalamic-endocrine system. Fluids and electrolytes, androgens, and Pamabrom were included in the "Major Prescription" as needed.

Psychotherapy, education, and rehabilitation were considered the most important elements of the treatment, with the others serving as adjuncts. The merit of the treatment was attested by a pronounced reduction in violent behavior, shortened hospital stay and increased discharge rate, and improved rehabilitation.

Pamabrom was given either as Pamabromal or M Minus 5 through the courtesy of Whittier Laboratories, Chicago.

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A Thirty-Six Year Study of Diseases of the Chest on a University Campus

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MANAGEMENT AND TREATMENT OF PULMONARY TUBERCULOSIS

One of the chief objectives of this clinic has been to prevent dissemination of tubercle bacilli by students and personnel; hence, the frequent periodic examinations of those who had tuberculous lesions before entrance but were classified as arrested. Whenever their lesions showed evidence of reactivation or new ones appeared, our first concern has been to determine whether they were eliminating tubercle bacilli. Among students who had previously unknown demonstrable lesions on entrance to school, it has been impossible to determine the duration of the disease, except in a few who had previously had periodic tuberculin testing. However, this number has notably increased during the past decade. If tubercle bacilli were promptly recovered, treatment was immediately recommended. If not, and the lesions were minimal, careful observation was recommended with x-ray films and bacteriologic studies of gastric washings. If the lesions were found to be well stabilized, students were permitted to remain in school with frequent periodic examinations.

Those found to have unsuspected pulmonary tuberculosis on entrance, as well as those in whom lesions evolved to clinical proportions while in school, were always asked if they had family physicians. If so, our policy has been to contact these physicians, transmit our findings to them, and request the students to report to them promptly for management. Many physicians expressed a desire that we proceed to recommend or carry out whatever treatment seemed indicated. We also made such recommendations for treatment of those who did not have family physicians. Those with advanced contagious tuberculosis were advised to be hospitalized promptly. When necessary, they were admitted to our Students' Health Service hospital until they could be transferred to sanatoriums. After

maximum benefit had been derived from sanatoriums, many were returned to school and again came under our observation and care.

There were students who had been treated before their first admission to the University and who were still receiving artificial pneumothorax. Others, whose disease became clinical while in school and who were sent to sanatoriums, were returned to us while still on artificial pneumothorax. All such cases were continued on this treatment in our clinic as long as it seemed indicated.

Since 1920, we have frequently instituted artificial pneumothorax for minimal to moderately advanced pulmonary lesions which were proved to be progressive but which had not caused serious symptoms.³⁰ Adequate collapse of involved areas usually promptly freed the sputum or gastric washings from tubercle bacilli or prevented them from becoming contagious. This treatment ordinarily has been instituted in the hospital where students remained for a brief period and then returned to school while the collapse was maintained. Thus, many students were treated on the campus with little interruption of school work and were able to graduate with their classes.

In relatively few, serious complications occurred, such as tuberculous pneumonia in the contralateral lung and mixed infection empyema in the pneumothorax cavity. In recent years, antituberculosis drugs have been administered for a week or so before instituting pneumothorax and continued simultaneously with the collapse. Although the number of patients treated by artificial pneumothorax has decreased over the past ten years, we have seen no serious complication develop among those who have received it.

Since 1948, the majority of our students treated for tuberculosis before entering school have had pulmonary resections. Most of them have been treated in Veterans' Administration hospi-

tals and their schooling is being provided by the Veterans' Administration. A minority group has received similar treatment in civilian sanatoriums. In a few students whose disease evolved while in school, we have administered antituberculosis drugs and recommended surgical resection in the University Hospital or other hospitals.

The resection of a reinfection clinical tuberculous lesion, whether small or extensive, does not cure tuberculosis. It only removes the lesion that is offending at the time, but remaining lesions not yet demonstrable as to location may later attain such proportions. Because tuberculosis is a lifetime disease, final prognosis cannot be determined as long as the tuberculous individual is alive. Therefore, prognostic determinations based on short follow-up periods are not only of little value but also may be misleading. A five-year period of observation is of almost no significance, and ten years is of little value. Such short periods of observation often lead to erroneous deductions.

PRIMARY TUBERCULOSIS

In addition to students who presented clinical reinfection type of pulmonary tuberculosis, we have had many in whom primary disease developed while they were in school. A major portion of them were in the schools of nursing and medicine. A relatively small percentage, rarely more than 5 to 8, of this group presented primary infiltrates of such size, location, and consistency that they cast visible shadows on x-ray films.^{18,19}

Diagnosis. These infiltrates cannot be differentiated from reinfection type of lesions from shadows. Only when the individual has a tuberculin testing record and has recently converted can one be certain the new lesion is of the first infection type. After they are first seen, primary infiltrates rarely increase in size. Shadows may appear unchanged month after month, then slowly resolve until they are no longer in evidence on x-ray film or, at most, leave small densities suggesting fibrous deposits. In some of these areas, which even become invisible on x-ray films, calcific deposits appear later and, sometimes, are visible in regional lymph nodes about the same time.³¹

In the occasional primary infiltrate, evidence of small excavation may appear. In such cases, pulmonary hemorrhage has been observed, and it is not unusual to recover tubercle bacilli from gastric or bronchial washings or even sputum for a brief time. However, even these primary infiltrates promptly come under control in the usual manner. We have not seen a case of so-

called immediately progressive primary infiltrate among our students.

Some reports claim that a given percentage of students examined are classified as having primary tuberculosis on the basis of shadow-casting densities interpreted as calcific deposits. They do not usually represent more than a fourth to a half of the persons in the group who actually have such deposits but which are too small or are located so that they are not visible on x-ray films. Miller³² studied roentgenograms and dissections of 400 pairs of excised lungs and observed that calcification of the first infection is roentgenographically demonstrable in only about one-fourth of the cases. He said, "The superimposition of structures of varying density and factors of cardiac and intrapulmonary vascular movement and the minute size of many of the calcium deposits are responsible for this." Sweany³³ made postmortem films of 188 lung specimens after they were removed and inflated. While 98 calcium deposits were found in this manner, only 48 had been recognized on antemortem films.

When calcium deposits are observed by the shadows they cast, one cannot safely refer to them as representing primary or first infection type of tuberculosis. Calcification is largely a sequel to avascularization and total necrosis and is nonspecific. There are numerous other disease processes, particularly fungous infections, which result in deposits of calcium whose shadows are identical to those appearing in tuberculous lesions. Frimann-Dahl and Waaler³⁴ made postmortem examinations of 200 bodies with antemortem x-ray films available. In 48, they found calcification, ossification, and other such conditions which so often cast shadows interpreted as tuberculous but which were the results of foreign bodies, emboli, thrombi, and silicosis.

Even in tuberculin reactors, one is never justified in referring to calcific deposits as representing healed, first infection type of tuberculosis. The calcium is deposited in dead material, and there may be small or large progressive lesions in the immediate vicinity not visualized on the x-ray film, as well as necrotic areas harboring many tubercle bacilli. To date, the word "healed" belongs entirely to the pathologist who is entitled to use it only after a thorough study of the lesion with the microscope and cultures or animal inoculation.

While many calcium deposits visualized on the x-ray film may appear the same year after year for long periods, others may be resorbed and, thus, disappear from roentgenographic view. It is not unusual for such deposits to erode the

walls of bronchial ramifications and even enter lumina. Some may be expectorated as pneumoliths, while others are aspirated peripherally and can result in foreign-body abscesses. When the sharp edges of the calcium deposits cut through bronchial walls, slight hemoptysis or even frank hemorrhage may occur, and tubercle bacilli from the lesions in which the calcium is deposited may enter bronchial lumina and be expectorated.

Management of primary tuberculosis. When the report appeared in the literature that the incidence of tuberculin reactors among children and young adults in Minnesota was so rapidly decreasing, many persons from other areas, and a few here, entered into considerable speculation as to the connotation of such a situation. Although the bovine type of tubercle bacillus in this area had been almost eradicated, this status was questioned by those who still believed this type of bacillus should be present in foods to immunize against tuberculosis. Some also believed that every human body should contain tubercle bacilli, and they had great fear for those who had been protected against them. Therefore, they recommended that we inject living tubercle bacilli, which were then thought to be of low virulence, into every uninfected student.

Other individuals were still discussing "virgin soil." This was a theory based on the opinion that if people and animals were deprived of tubercle bacilli, generations would develop with no resistance. To them, it appeared we were creating "virgin soil," and if uninfected persons should later become infected, they would be decimated by tuberculosis.

As late as 1949, a physician wrote, "The situation in Minnesota may be likened to a safety zone that lies in the midst of streaming traffic. To carry the analogy a bit farther, the wise Minnesotan will remain on his little island if he wishes to retain his health. To travel abroad without any immunity might prove particularly hazardous. Of course, if he so desired, he might remain where he is until traffic around him quieted down, but that might take a good many more years." The writer of this article apparently did not know that in 9 other states tuberculosis was at lower ebb than in Minnesota. Therefore, there were 10 safety zones or islands and many others in this country where tuberculosis was almost as well controlled. This author apparently did not know that Minnesotans travel as freely in other parts of this nation and abroad as citizens of most other states. In 1955, Minnesota ranked thirteenth among the states in terms of overseas travelers. Yet, their tuberculosis mortality, morbidity, and infection attack rates con-

tinue to decrease. Moreover, many young women and men served in countries where tuberculosis is rife during World War II. Many of them entered the University of Minnesota in 1946 and 1947, and the question arose as to whether the increased incidence of tuberculin reactors was caused by excessive exposure in military service or because these students were several years older than the usual entering students. In the school year 1947-1948, when there were many thousands of servicemen on the campus, a special survey³⁵ was taken during which 12,415 persons were tested with tuberculin, and 23.3 per cent reacted. Of these, 9,062 were veterans, 27 per cent of whom reacted; 3,353 were nonveterans, of whom 13.4 per cent reacted. With few exceptions, differences in age of veterans and nonveterans were adequate to account for the higher reactor rate among veterans. Obviously, many veterans became infected abroad, but not at a significantly higher rate than those who remained in the United States. However, they presented no different tuberculosis problem than that seen among students in former years.

Furthermore, students infected abroad as adults did not present different situations than those who had acquired first infections while students in schools of nursing and medicine. All responded as children do when first infected.

Therefore, the theory that it is dangerous to future tuberculosis control if the young are not infected with tubercle bacilli has been replaced with the fact that the only safe procedure is to protect humanity everywhere, regardless of age, against primary infection with tubercle bacilli. The idea that bringing on generations of people uninfected with tubercle bacilli creates a dangerous so-called "virgin soil" is a myth. The old theory that the child or adult who has tuberculous infection, as manifested by sensitivity to tuberculin, walks in a charmed circle of safety has been replaced by the fact that such persons walk within the circle where all illness and death from tuberculosis occur.

Treatment of primary tuberculosis. In our experience, primary pulmonary infiltrates demonstrable by shadows on x-ray films practically always respond the same way, regardless of how little or how much treatment is administered. During our earlier observations, we thought that demonstrable lesions in the lungs of students were always of the reinfection type, because it was assumed that practically all adults had been infected as children, and, therefore, new lesions were of the adult reinfection type. Later, much was heard about immediately progressive primary lesions among young adults. Therefore, we

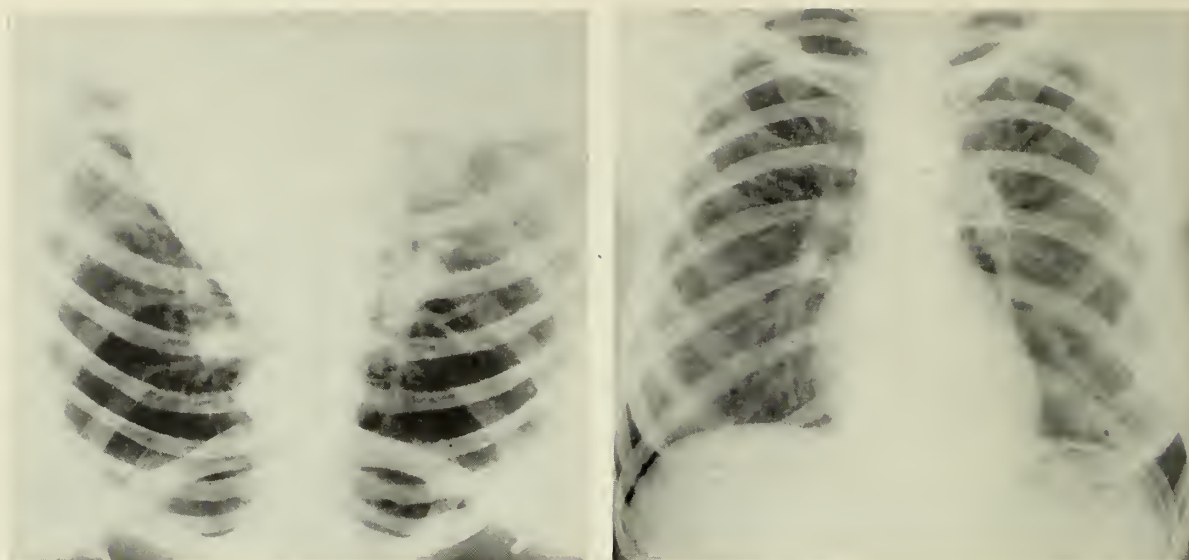


Fig. 7a (left). From a roentgenogram taken July 1947 of the chest of a 21-year-old nursing student. Note extensive disease in base of right lung and hilum. She entered the school of nursing as a nonreactor to tuberculin in 1944. In February and March 1947, she took training in a sanatorium. In June 1947, she reacted to tuberculin, and x-ray film revealed shadow-casting lesions. Previous films had been clear. No change occurred through 1948. In early 1949, x-ray shadows began gradually decreasing in size and finally disappeared. June 10, 1947, she reported a two-month pregnancy. She was hospitalized for three weeks to observe pulmonary lesions. The diagnosis was primary tuberculous infiltrates. She was discharged to her home until after delivery. She returned in March 1948 to complete the nursing course. She has led a normal life since graduation. Fig. 7b (right). From roentgenogram of same chest May 1955, when her 5 children were $7\frac{1}{2}$, 6, 5, $3\frac{1}{2}$, and 2 years old. She said, "Through all of this my health has been excellent."

recommended treatment of all patients with lesions that appeared to be of recent evolution. Some were placed on long periods of hospitalization; others received ambulatory artificial pneumothorax; still others, because of no symptoms, refused treatment. The end result of the primary lesions, *per se*, was the same in each group. The body's defense mechanism, with or without attempted aid by physicians, brought the lesions under control in the same manner. We had overlooked the fact that the primary pulmonary infiltrate is just a stage of the development of Ghon tubercle. After this observation, we discontinued treatment for primary pulmonary infiltrates (figures 7a and b).

In recent years, some primary pulmonary infiltrates have been resected. In view of our experience with such lesions, we have seen no indication for such treatment for either immediate or remote results. With the initial invasion of tubercle bacilli, the organisms are focalized in many places in the body. To remove one focus, which happens to be demonstrable by the x-ray shadow it casts, does not cure the disease in any sense or is there yet any evidence that it reduces later endogenous reinfections from the remaining initial lesions.

Although primary lesions were regularly observed to come under control without causing serious illness, we knew that tubercle bacilli remained alive and were harbored in necrotic

tissue in the lesions of primary tuberculosis complexes. Therefore, the disease was not cured in the strict sense of the word. It was also known that the apparently well walled-off primary lesions in lungs and regional lymph nodes often later liberated tubercle bacilli on allergic tissue, thus resulting in endogenous reinfections, which often became clinically significant and contagious. All that could be done at that time, however, was to periodically examine students and personnel who reacted to tuberculin with the thought of finding chronic reinfection type of lesions which appeared destined to evolve as soon as they were large enough and of sufficient consistency to cast visible x-ray shadows (figure 8).

Our lament was that no method of treatment was available to prevent endogenous reinfections. Once tubercle bacilli had invaded human tissues and set up primary foci in various organs, we were helpless to do more than watch and wait for the appearance of clinical disease which might evolve at any subsequent time throughout the span of life.

With the introduction of antimicrobial drugs came the hope that we might be approaching a situation similar to that of syphilis, pneumococcal pneumonia, and other such infections, because drugs had become available which were germicidal for pathogenic organisms in living human tissues. It was hoped that streptomycin,



Fig. 8. From a roentgenogram of the chest of a 45-year-old University employee taken March 16, 1951. Note lesion in right lung near periphery partially obscured from view by anterior right second rib. Previous x-ray films had been clear. She had been a tuberculin reactor for several years. This lesion proved to be a progressive tuberculous process. No significant symptoms were present, but tubercle bacilli were found in gastric washings. Nearly all chronic pulmonary lesions can be found in this early stage by periodically examining adult tuberculin reactors. These lesions may appear any time after the tissues are allergized throughout the remainder of the individual's life.

para-aminosalicylic acid, and isoniazid, singly or in combination, might destroy all tubercle bacilli in the human body. However, one characteristic of tuberculous lesions, namely, that they lose their blood supply, dims hope of destroying tubercle bacilli except in fresh areas of disease which have retained their vascularity. Obviously, therefore, the only time that one might expect to cure tuberculosis with drugs in the strict sense, that is, destroying all tubercle bacilli, is reasonably soon after the initial invasion while lesions are small and vascular.

Although lesions begin to form within an hour after invasion, it is not known how soon their blood supply is lost. Therefore, Waring³⁶ and others have recommended that antituberculosis drugs be administered as soon as possible after the initial invasion. Such invasions cannot be detected until the individual's skin has become sensitized to tuberculoprotein, which usually occurs within eight weeks. Thus, the conversion of the skin to a state of sensitivity detectable by the tuberculin reaction is the only criterion for beginning administration of drugs.

It is not yet known whether present antituber-

culosis drugs, singly or in combination, are capable of destroying all tubercle bacilli. However, some strong evidence has accrued to suggest that bacilli are so suppressed that they are not likely to result in serious acute forms of the disease, such as meningitis and generalized miliary tuberculosis, conditions formerly seen in a small percentage of persons soon after sensitivity was established.

During the course of antituberculosis drug treatment, the only criterion by which its effectiveness might be determined is the reversion of skin sensitivity. There is evidence that a constant supply of liberated tuberculoprotein is essential in the body to maintain sensitivity of tissues and that if it ceases to be produced, sensitivity is lost. Cases have already been reported in which reversion of the tuberculin reaction has occurred during the course of antituberculosis drug treatment. However, it has not yet been determined whether all tubercle bacilli have actually been destroyed or whether they have only been suppressed to such low level that they are not multiplying, and, therefore, tuberculoprotein is not available to maintain sensitivity.

If antituberculosis drugs only suppress tubercle bacilli to this low level, one may expect that after the drugs are discontinued, the bacilli may later resume ability to multiply and liberate sufficient tuberculoprotein to again sensitize the tissues. This is a discouraging thought, but it must be considered since tubercle bacilli recovered from resected pulmonary lesions after long periods of drug treatment have failed to produce immediate disease in guinea pigs or to grow on culture mediums. However, when allowed to incubate for several months, a considerable percentage of tubercle bacilli resume multiplication.

Twenty years ago, we had a great many tuberculin converters on this campus, particularly in the schools of nursing and medicine. In fact, in the medical school class of 1936, 65 per cent of those who entered uninfected became infected before graduation.¹⁴ We now have so few tuberculin converters that an adequate study of drug treatment among them is not possible. However, among the small number to whom we have administered antituberculosis drugs, there are now 2 whose tuberculin sensitivity reverted after approximately one year of treatment.

If present or future drugs prove to be dependably germicidal when in contact with tubercle bacilli in human tissues, for the first time in history, the medical profession will be able to cure tuberculosis in the sense of eliminating the infection. It must be emphasized, however, that

such effective treatment will probably be possible only when administered before lesions have lost their blood supply.

The importance of differentiating between primary and reinfection forms of tuberculosis cannot be overemphasized. Failure to do so has already led to such erroneous deductions pertaining to efficacy of therapeutic and preventive measures as to mislead tuberculosis workers of the world. To date, no credit can be given any therapeutic procedure for having influenced the course of primary tuberculosis, although drugs may prove an exception. Nevertheless, claims have been made for some measures without taking cognizance of the primary lesions included in the observations.

Students should know meaning of primary tuberculosis. It is our firm conviction that we owe all students who enroll in this school a definite statement telling them whether they are harboring tubercle bacilli as manifested by a characteristic reaction to the tuberculin test. In addition to presenting the student with this information, time should be taken to explain to him that his body became invaded with tubercle bacilli some time after birth and that they still reside in numerous places. He should know that he may go through a long life without illness or incapacity from tuberculosis, but this is not assured. He should be told that at any time, soon or in the remote future, one or more clinical lesions may develop. This places him on guard and explains why he receives periodic notices for re-examinations while in school. If no clinical lesion evolves during his school years, he should then be informed of the potentiality through the rest of his life and that, therefore, periodic examinations should be continued. This should be considered as valuable as anything he learns in school.

We have seen many persons who reacted to tuberculin on admission to school or became reactors while in school who had clear x-ray films and no other evidence of clinical disease on graduation in whom demonstrable lesions developed within one to thirty or more years. Those who had been examined periodically since leaving school usually had the disease detected while still in the minimal stage, while those who neglected periodic examinations until symptoms appeared ordinarily had advanced disease.

PLEURISY WITH EFFUSION

In addition to the many pleural effusions of nontuberculous etiology, tuberculous effusion was diagnosed in 119. Since these cases were recently reported elsewhere,³⁷ only a brief discussion of the subject is presented here.

Tuberculous pleurisy with effusion is usually an allergic reaction resulting from an invasion of tubercle bacilli from a tuberculous lesion, often primary, located subpleurally in the lungs or chest wall. Like meningitis and generalized miliary tuberculosis, it may occur soon after primary tuberculous lesions are established or years and decades later.

For a few days after the initial pain is experienced, fluoroscopic and x-ray films of the chest may be unrevealing except for evidence of splinting of the diaphragm and chest wall. Rigler³⁸ has shown that less than 300 cc. of fluid in a pleural space is not demonstrable by x-ray inspection in the usual posteroanterior diameter. In the lateral-decubitus position, however, 100 cc. may be detected.

Tubercle bacilli are often difficult to find in tuberculous pleural fluid. Recently, Stead and associates³⁹ have resorted to thoracotomy and biopsy. Thus, accurate diagnoses can now be made more often, and the term "idiopathic pleurisy with effusion" will be justified in the future only when pathologic and bacteriologic studies of biopsies fail.

Tuberculous pleurisy is merely an incident in the life of the infected person. It may be the last one, or it may be followed by others in various locations. It has often been preceded by other clinical lesions. Among 247 persons who had pleurisy with effusion whom we traced, including our students, 11 had died from nontuberculous conditions. Clinical tuberculosis had developed in 23 or 9.7 per cent of the remaining 236 who had 4,620 combined years of follow-up. Extrathoracic lesions were found in 10, and the remainder had pulmonary lesions. Of the 10 with extrathoracic lesions, 2 had died; 1 from meningitis and 1 from peritonitis. The tuberculous disease was well controlled among the 13 in whom pulmonary lesions had developed, but 2 had died from nontuberculous conditions. All had apparently completely recovered from the pleural condition.³⁷

From our observations, persons who have had tuberculous pleurisy with effusion are no more likely to contract clinical disease later, in the lungs or elsewhere, than persons who have not had it, but are tuberculin reactors. Thus, pleurisy with effusion is only one of many immediate and remote possibilities among infected persons. Clinical tuberculosis develops in most people without intervention of pleurisy with effusion.

EXTRATHORACIC TUBERCULOSIS

Since 1920, we have seen 61 persons with extrathoracic tuberculosis. Of this number, only 2

had *meningitis*. One entered school at the age of 19 in 1939. He reacted to tuberculin, which was the only evidence of tuberculosis. In 1941, fatal tuberculous meningitis developed. The other had meningitis in 1953 and has since been treated successfully with antituberculosis drugs.

Renal tuberculosis was found in 7 students. Although nephrectomy was earlier thought to be indicated when the disease was unilateral, 2 of these students were treated successfully without surgery.

Cervical *lymph nodes* were involved in 22 of our students. Some had been treated successfully before entering school, and other cases evolved while the students were in school.

We saw 22 students with tuberculosis of *bones and joints*, some of which dated back to infancy and childhood. Among them were students with hunchback deformities and ankylosed hip joints. Others had been diagnosed sufficiently early and treated so promptly that crippling was prevented.

One student had tuberculosis of the soft palate, 2 had tuberculosis of the parotid glands, 4 had tuberculous peritonitis, and 1 had a tuberculous uterine tube involvement which was discovered during appendectomy.

The incidence of clinical extrathoracic lesions has decreased correspondingly with the decrease in the annual tuberculosis infection attack rate among children and young adults. Early in this century, from 50 to 75 per cent of the admissions to the state hospital for crippled children in Minnesota had tuberculosis of bones and joints. It is now less than 1 per cent. Dr. C. C. Chatterton, long-time chief of medical services at the Gillette State Hospital for Crippled Children, says that pasteurization of dairy products followed by almost total eradication of tuberculosis among cattle definitely reduced the incidence of bone and joint tuberculosis among children and young adults. In countries where the bovine type of tubercle bacillus has not been brought well under control, rarely more than 20 per cent of tuberculosis of bones and joints is caused by the bovine organism. It may be assumed, therefore, that approximately the same situation existed in this area, and, thus, about 80 per cent of tuberculosis of bones and joints was due to the human type of tubercle bacillus. Children have been so protected against the human type of bacillus that the incidence of tuberculin reactors has been greatly reduced. It is this decreased incidence of infection with both bovine and human types of tubercle bacilli that has resulted in such pronounced decrease of both pulmonary and extrathoracic clinical tuberculosis among people.

CHANGED ATTITUDE

The change in attitude toward tuberculosis on our campus over the past few decades has been most encouraging. In the 1920's, when there were so many clinical cases, they were accepted by students and faculty alike almost as a matter of course. Now, finding a clinical case constitutes news and sometimes consternation among the patient's associates. For example, in 1955, reactivation developed within weeks after the last periodic unrevealing examination in a faculty member whose pulmonary lesions had been under observation elsewhere and here for twenty-one years. He was promptly admitted to the hospital where one of the students holding a fellowship in medicine expressed considerable indignation, and reprimanded the staff for allowing such an occurrence on the campus. This was in sharp contrast with the attitude of students in such capacity a third and even a quarter of a century ago, when the case would not even have received special mention.

It cannot be repeated too often that all tuberculosis should be found while in the primary stage. This can be done only with the tuberculin test. Primary tuberculosis always precedes reinfection clinical forms of the disease. Therefore, all persons with primary lesions as manifested by the tuberculin reaction should be alerted to future potentialities.

PRESENT AND FUTURE TUBERCULOSIS PROBLEMS

Although phenomenal accomplishments have been achieved in the control of tuberculosis on this campus during the past thirty-six years, a problem of considerable magnitude still exists today. On the basis of the tuberculin testing of students on admission, probably about 15 per cent of current students are harboring tubercle bacilli in tuberculous lesions. Thus, there are about 3,400 such persons on the campus. Each must be considered to have tuberculosis with at least primary lesions which are forerunners of clinical tuberculosis. Past performances justify the conclusion that clinical disease will evolve in some of these students before and in many others after they graduate. This also applies to academic and nonacademic school personnel.

The future problem depends upon a number of situations: (1) a local or national catastrophe that could unfavorably change the state or national tuberculosis situation in a short time, (2) the percentage of tuberculin reactors among future students on entrance to the University, and, (3) the intensity of the tuberculosis control program on the campus.

There are still enough cases of contagious tuberculosis in Minnesota and in the nation to infect large numbers of our people in a short time in the event of a catastrophe that would permit free mingling with the public. Recent dangerous situations have been created which may result in excessive infection rates among preuniversity age individuals. For example, approximately 1,000,000 displaced persons, mostly from countries where nearly all adults are harboring tubercle bacilli, have been admitted to this country. Already, they are responsible for a crop of clinical tuberculosis, and the crop will probably become larger from year to year. Apparently, federal or state organizations know little of their whereabouts, and, in many cases, their lesions became contagious before their disease was detected. A senate committee has estimated that there are from 3,000,000 to 5,000,000 illegal aliens in this country, largely from parts of the world where tuberculous infection is well-nigh universal, even among young adults. Because of possible deportation if found to have tuberculosis, these persons do not report with any health problem until it becomes serious.

There is also the problem of veterans still returning from such places as Korea who have contagious tuberculosis or in whom it may develop later. People of 40 or older comprise the "tuberculosis seedbed" of America and now provide a half or more of the clinical cases and deaths from tuberculosis in many parts of this country. Unless this problem is attacked more vigorously, persons in this age group may infect large numbers who will subsequently enter colleges and universities.

When our clinical tuberculosis problem was most serious, a large percentage of grade school children in this area were infected with tubercle bacilli. In Minneapolis, 70 per cent reacted to tuberculin in 1916, and 47 per cent reacted in 1926. In 1954, only 4 per cent reacted, while in rural areas, the incidence was lower. In fact, rarely do more than 4 or 5 per cent of the senior students in rural high schools react to tuberculin. Therefore, it is possible that before long the incidence of tuberculin reactors on entrance to the University will show annual decreases just as was observed before 1946.

The intensity with which the tuberculosis control program is executed on the campus will continue to be a major factor. Periodic examination of all tuberculin reactors, both those who enter infected and those who acquire infection while in school, is now within the realm of physical possibility. This is the only known method by which reactors in whom clinical chronic pulmo-

nary tuberculosis is destined to develop while they are in school can have their lesions detected in the presymptom and precontagious stage and be treated with a minimum of time and effort. Relaxation of present efforts could soon result in a much greater problem in the future. In 1956, 2 entering students had contagious tuberculosis and 1 faculty member became contagious. Had it not been that the disease was promptly recognized, these 3 people could have spread tubercle bacilli among many associates. As long as there is a single tuberculin reactor on this campus, there is a tuberculosis problem.

Tuberculosis is an important item in our national defense.⁴⁰ Any nation with one-third of its citizens harboring tubercle bacilli is not safe. In the past, disease has caused the loss of more military battles and conquered more nations than is generally appreciated. Tuberculosis could still be the cause of the downfall of this nation.

I know of no group better qualified and equipped to aid in the solution of this national defense problem than our student health services. They now know how to demonstrate to their student bodies, through actual participation, the best methods of combating tubercle bacilli. In turn, these students, later taking over the affairs in their respective communities, will contribute their knowledge and influence to many others in the solution of this problem in our national defense.

SUMMARY AND CONCLUSIONS

A chest clinic was established at the University of Minnesota Students' Health Service in the fall of 1920, which has since been in continuous operation. From 1920 through the 1955-1956 school year, 162,320 students, exclusive of the graduate school, have entered this University. All had general physical examinations. Since 1928, the tuberculin test has been a part of the routine entrance examination, and, since 1931, reactors to tuberculin have had chest x-ray film inspections.

Beginning in 1929, all entering students received fluoroscopic chest inspections. In 1946, photofluorograms were substituted for fluoroscopic inspection. Since the fall of 1920, 7,640 students and faculty members have reported for special chest examinations. Many of them were re-examined many times, and treatment was administered as indicated.

Practically all nontuberculous chest conditions that develop in this area have been seen in this clinic. Eighty-six persons were found to have bronchiectasis; simple spontaneous pneumothorax was seen in 98 students; and diaphragmatic adhesions were observed in 545. Numerous

other conditions have been seen more rarely, including pulmonary cysts, chronic hypertrophic emphysema, pulmonary fibrosis of undetermined etiology, sarcoidosis, teratoma, bronchial adenoma, and Hodgkin's disease.

Since 1945, histoplasmin and coccidioidin have been used extensively in differential diagnosis. A survey conducted in 1947-1948 revealed that 8.8 per cent of our students reacted to histoplasmin and 1.3 per cent to coccidioidin.

Throughout the thirty-six years, tuberculosis has been the most prevalent and most serious disease among students and personnel. No progress was made as long as efforts were limited to finding and trying to repair gross damage done by tubercle bacilli. Not until the attack was made on the tubercle bacillus did encouraging results appear. This attack consisted of dividing entering students into 2 groups: (1) those who reacted to tuberculin and, therefore, were harboring tubercle bacilli and (2) those who had not been infected. Tuberculin reactors were promptly examined in order to find those who already had gross lesions.

A preponderance of students with clinical tuberculosis were from our schools of nursing and medicine. They afforded our best opportunities to study this disease. In addition to the initial examination of all tuberculin reactors, they were given semiannual examinations, including x-ray films of the chest, while in school. This procedure revealed that clinical lesions which evolved could usually be found before they had caused symptoms or had become contagious.

Those who did not react to tuberculin on entrance to these 2 schools had this test repeated semiannually as long as they were nonreactors. When students converted to reactors, we were usually able to trace the source of their infections. These sources were among sanatorium patients as well as those in general hospitals with previously unknown contagious tuberculosis. Recognition of such situations permitted their discontinuance or correction.

The tuberculin test proved to be the master key in our entire tuberculosis control program. It was our earliest diagnostic agent in that it detected the presence of disease within a few weeks after invasions occurred. It was our best epidemiologic agent in that it led us to sources of infections more directly and promptly than any other procedure. It was the only method by which we could determine the magnitude of the tuberculosis problem. It revealed who should be examined periodically. It placed responsibility in cases that came to litigation. It was the only method for promptly determining the effec-

tiveness of our program, and now it may indicate when to start and stop treatment.

From the standpoint of detecting gross lesions, the x-ray film proved to be our earliest method. In order to cast visible x-ray shadows, lesions must be gross, have adequate consistency to obstruct x-rays, and be located in the 75 per cent of the lungs seen on x-ray film.

Calcium deposits in the lungs and hilum region are not pathognomonic. They are the result of numerous conditions, including fungous infections and tuberculosis.

Clinical pulmonary tuberculosis has been diagnosed in 1,063 persons who reported to our clinic. Some had the disease before entering school; in others, it was first found on admission to school, and, in still others, it evolved while they were in school.

Management of cases has varied from observation and periodic examinations through all the procedures in vogue at different periods, including collapse therapy, antituberculosis drugs, and resectional surgery. Those with contagious tuberculosis which could not be promptly converted to noncontagious were referred to their family physicians or to sanatoriums. Ambulatory artificial pneumothorax was employed in many cases. This, simultaneously with antituberculosis drugs, is regularly employed in suitable cases. Resectional surgery is recommended when indicated. A few recent tuberculin converters have been treated with antituberculosis drugs.

Primary tuberculosis has developed in many of our students, particularly those in schools of nursing and medicine. A small percentage of such persons have had demonstrable pulmonary primary infiltrates (inflammatory stage of Ghon tubercle) which receded with great uniformity regardless of how much or how little treatment was administered. Primary tuberculosis which developed in young adults behaved in the same manner as that acquired in childhood. We have seen no case of immediately rapid progressive primary tuberculosis.

No evidence has accrued to indicate that the majority of cases of clinical tuberculosis develop within the first two years after the initial invasion occurs.

Prevention of tuberculosis among students includes creating environments as free from tubercle bacilli as possible in order to avoid the initial infection. Once infection occurs, the physician has no recourse, unless antituberculosis drugs become effective, except to keep the individual under close surveillance and detect lesions destined to evolve as soon as present methods of examination locate them.

In 1935, a project was developed which provided a tuberculosis examination of all patient admissions and all personnel of our University Hospital. This procedure has since been routine and has extended to all hospitals in Minneapolis and St. Paul.

In the early 1930's, an effective contagious disease technic was developed to protect students, personnel, and others from tubercle bacilli.

Because neither a mild nor severe attack of tuberculosis results in dependable immunity, we have seen no premise for attempting to produce immunity artificially.

The incidence of contagious tuberculosis increases as people grow older. Thus, a tuberculosis control program among faculty and personnel members is exceedingly important.

Among several hundred students from other countries, most of whom were in the graduate school, the incidence of tuberculin reactors was more than 4 times that of the entire student body. During the past six years, they contributed 60 per cent of our cases of clinical tuberculosis, although they constituted less than 3 per cent of the entire enrollment.

Tuberculous pleurisy with effusion was seen in 119 individuals.

Extrathoracic tuberculosis involving bones, joints, kidneys, lymph nodes, and meninges has been observed in 61 persons.

Tuberculosis remains the largest health problem on this campus. There are more students and faculty members who are harboring tubercle bacilli and already have clinical lesions or are potential cases than is the case of any other major disease.

There may be students or faculty members on a campus with clinical, and even contagious, tuberculosis who feel and appear well and are not discovered unless a detailed search is made for them. The best search consists of testing all with tuberculin and completely examining reactors, including x-ray film inspection of the chest.

Every student who reacts characteristically to the tuberculin test, either on entrance or while in school, should be appraised of the fact that multiple lesions exist in his body and that they contain living tubercle bacilli. Moreover, he should be informed that these organisms may produce gross and clinical disease at any time during the remainder of his life. However, such disease can usually be detected before it has caused much destruction or spread to others and when it can be treated successfully.

Tuberculosis is a serious problem in our national defense. Student health services can do much to help solve this problem.

ACKNOWLEDGMENTS

From its beginning, the clinic for diseases of the chest has received unqualified support from the presidents of the University, Health Service directors, and all others concerned.

Assistant medical directors who have also given unlimited support to this clinic include: W. P. Shepard, now second vice-president, Metropolitan Life Insurance Company, New York City; H. D. Lees, director, Students' Health Service, University of Pennsylvania; and Donald W. Cowan, present assistant director. Health officers of the University Hospital and staff members of the Health Service who have been important contributors to the success of this clinic are: Ralph G. Ellis, Veterans' Administration Hospital, Alexandria, Louisiana; Myron M. Weaver, dean of the School of Medicine, University of British Columbia, Vancouver; Dr. Phillip D. Kernan; and Dr. Philip Hursh.

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Throughout the years, we have received fine support from those working in other specialty clinics, such as ophthalmology, nose and throat, orthopedic, dermatology, and surgery, in making examinations and administering treatment for conditions closely related to various chest diseases.

This clinic has been blessed by excellent nurses, 2 of whom deserve special mention because of their long years of service, loyalty, high quality of work, and special participation in this clinic. They are Marguerite Lydon, who has been with the clinic since it was established, and Leona LeBlanc, who has been associated with the clinic since 1927.

Josephine Apker came to the Health Service in 1929. Since 1939, she has been secretary to the director. She has been an invaluable member of the staff whose loyal and conscientious service has contributed immeasurably to the whole Health Service program.

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Although the Students' Health Service has operated independently of the University Hospital, there has been close association between the two staffs with frequent consultations and special procedures performed by the hospital which the Health Service was not equipped to do.

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SPONTANEOUS PNEUMOTHORAX occurs during the first ten days of life in probably about 0.07 per cent of infants.

With mantle or small partial pneumothorax, the roentgenogram shows the lateral border of the lung parallel to the thoracic wall. With alternating pneumothorax, gas appears first in one, then in the other pleural space. Contralateral shift of the mediastinum, widening of homolateral intercostal spaces, and depression of the homolateral diaphragm are apparent roentgenographically with tension pneumothorax, and thoracentesis releases gas under pressure.

The cause of spontaneous pneumothorax is not known. Possibly, pulmonary interstitial emphysema, followed by mediastinal emphysema and rupture of the mediastinal pleura into the pleural cavities, is responsible.

Air in the pleural space is removed without aspiration if pleural leakage does not continue. With increasing or tension pneumothorax, however, thoracentesis is done promptly and continuous drainage by means of an underwater trap is instituted. Aspiration and drainage are of little value for aspiration pneumonia, hyaline membrane disease, or mediastinal or pulmonary interstitial emphysema.

VIRGIL M. HOWIE, M.D., and MAJ. ALLEN S. WEED, M.C. (Los Angeles Childrens Hospital and the University of Southern California, Los Angeles, and Langley Air Force Base, Va.): *J. Pediat.* 50:6-15, 1957.

American College Health Association News . . .

We wish to extend a hearty welcome to the following new members whose applications for membership have been approved by the Executive Committee of the Association:

Northeastern University, Boston, Massachusetts. Representative: George M. Lane, M.D., University physician. Alternate: Herbert W. Gallagher, director of student activities, health, physical education, and Athletics.

Wake Forest College, Winston-Salem, North Carolina. Representative: Ozmer L. Henry, Jr., M.D., director of Student Health Service. Alternative: Paul L. Garrison, M.D., assistant director of Student Health Service.

Florida Southern College, Lakeland, Florida. Representative: Ludd M. Spivey, president. Alternate: Ben H. McConnell, M.D., director of Medical Services.

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Roger E. Jacobi, secretary, is seeking nurses to serve on the Health Service staff this summer at the National Music Camp at Interlochen, Michigan. Anyone interested should apply to the National Music Camp, 303 South State Street, Attention of Mr. Roger E. Jacobi, Ann Arbor, Michigan. The dates of the camp period are June 23 to August 19, 1957, and the period of employment would be approximately the same.

Bone Structure and Metabolism, edited by G. E. W. WOLSTENHOLME and CECILIA M. O'CONNOR for the Ciba Foundation, 1956. London: J. & A. Churchill, Ltd. 299 pages. \$8.00.

This book contains a collection of papers dealing with various aspects of bone structure and metabolism presented by a group of international authorities in a symposium sponsored by The Ciba Foundation of London. Each subject is presented by a member of the group and followed by discussion by the various participants. The book is profusely illustrated with tables, graphs, and excellent photomicrographs.

Topics range from "Structure of Bone Salts" to "Osteodysmetamorphosis Foetalis" and are in general of greatest interest to the research minded. However, discussions on mode of action of vitamin D with particular reference to vitamin resistant rickets and hypervitaminosis D, a summary of present knowledge of parathyroid function, studies on vascularity of bone in Paget's disease, Sudeck's atrophy and osteoarthritis of the hip and deposition of radioactive materials in bone are of value to the clinicians.

The book is not one for general use but is a valuable addition to the reference library. Considerable preparation by the contributors has gone into its making.

GEORGE M. HART, M.D.

•
Principles and Methods of Sterilization, by JOHN J. PERKINS, M.S., director of Research, American Sterilizer Co., 1956. Springfield, Illinois: Charles C Thomas. 340 pages. \$8.00.

The title of this book belies its true intent, as stated by the author, "to



serve as a reference guide for sterilization practices in hospitals, clinics, laboratories, allied institutions and services." The author has succeeded well in realizing this goal, although the discussion is limited to those customary materials and supplies of hospitals which require sterilization: for example, parenteral fluids, syringes and needles, bed pans, dressings, surgical instruments, and the like. Thus, problems pertaining to disinfection of the air and of the skin are not considered.

The emphasis throughout this book is on the use of heat, especially in the form of steam, for sterilization of various materials and objects. Of course, Mr. Perkins' position may have something to do with this emphasis. Nevertheless, this is a most comprehensive and authoritative reference in the field of practical sterilization as applied to operations of the type encountered in the modern hospital. There is one 6-page chapter on "Chemical Disinfection" and another chapter on "Gaseous Sterilization with Ethylene Oxide." The interestingly written first chapter deals with historic aspects of the subject of this book and the second chapter is an elementary discourse on the "Thermal Destruction of Microorganisms." Of the 21 chap-

ters, 17 deal almost exclusively with the use of steam or boiling water to achieve sterilization of a variety of objects. These chapters are very informative and well documented. The extensive discussion of certain unit operations, such as the central supply service department, the infant formula room, and the preparation of parenteral solutions, is especially noteworthy. Even floor plans for such operations are included.

This book is profusely illustrated with 174 photographs, graphs, diagrams, and charts, all clearly reproduced. The quality of the paper and binding is excellent, the type is easy to read, the writing style is lucid, and the index seems to be thorough. No error was detected. This book will be of particular interest to those hospital and laboratory personnel who are concerned with the vital task of providing a constant flow of sterile objects to the various activities within a modern hospital or clinic. In addition, hospital administrators would do well to take note of certain sections of the book. This book is not intended, however, for those persons more interested in the fundamentals than in the practical aspects of sterilization and disinfection.

K. R. JOHANSSON

•
The Happy Life of a Doctor, by ROGER I. LEE, M.D., 1956. Boston: Little, Brown & Co. 278 pages. \$4.00.

Roger I. Lee is one of the most honored and esteemed internists in the post-Oslerian era in American medicine. This is evidenced by the high positions he has held in many departments of the field of hygiene and in medical organizations, both local and national. Harvard Univer-

(Continued on page 28A)



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BOOK REVIEWS

(Continued from page 182)

sity has acclaimed him as a native son despite the fact that he was born and reared outside Boston proper. He has been president both of the American Medical Association and the American College of Physicians, thus proving he has unusual ability in establishing leadership in the field of medical organization without encountering envious opposition.

This book is Dr. Lee's autobiography. In its pages he has maintained the judicious and pithy, yet gentle humor, that has characterized his writings on many subjects arising from his position as a leader in his field. He points out that his forbears were seafaring people and, later, outer New England farmers and merchants. Thus, while he was not a Bostonian Brahman, the "Lowells and the Cabots" took him to their hearts, as his story fully outlines. His biography reflects the cultural and medical development centering around Harvard University in the first half of this century. Concurrently, while sketching the events of his own life and work—both in peace and war—he tells of the heroic adjustments men in medicine were forced to make, especially those preparing to teach students in

this field. Each decade presented developments creating obsolete therapeutic and diagnostic approaches. Dr. Lee speaks for all of the men and women who lived and worked in the same period of rampant readjustment. The feeling of certainty and assurance that obtained at the turn of the century was nowhere better evidenced than in medicine. What an awakening followed! The advent of two world wars and constantly recurring military exploits have broken into the medical field with such violence that the political and economic dilemmas of our times have made this in the profession of medicine test to the core the soundness of the traditional Hippocratic concepts.

The pages of this book recount succinctly the manner in which this friendly and busy man has kept himself in the front rank of diagnosticians, in spite of the division of his field into a multitude of inner specialties. Note as an illustration his experience and contact with electrocardiography and his guarded appraisal of encephalography!

Finally, the chapters dealing with his family life, his many close personal friends, and especially the manner in which he is accepting the limitations imposed by that baffling

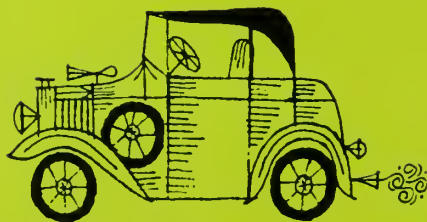
thief of comfort—rheumatoid arthritis—yield the keynote of why his has been "The Happy Life." By implication, he owes that faculty to his cultural association with the Lowells, the Koussevitzkys, and the Zinssers. In closing the saga of his life, he lists 13 alternative tombstone inscriptions. This reviewer would add a fourteenth: *He lived long and intimately with his obesity and helped not a little to lessen the obliquity imposed by cholesterol uncertainty.*

E. L. TUOHY, M.D.

Variations in Personality, A Multi-dimensional Study on a Series of 300 Healthy, 20-year-old Swedish Army Men, by G. EBERHARD NYMAN, 1956. Copenhagen: Ejnar Munksgaard. 20 kr.

This is an interesting study of the ratings made of a series of 20-year-old army recruits. Several mental traits were studied and attempts were made to judge the validity of the several tests used. Such studies naturally are of value to research workers who must compare the characteristics of the people in the control group with those in the group that they've been studying.

WALTER C. ALVAREZ, M.D.



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The Insulin Reaction

A Critical Review with Illustrative Cases

E. A. HAUNZ, M.D.

Grand Forks, North Dakota

EARLY IN THE FALL of 1949, a nationwide news report released to the Associated Press by the American Chemical Society created near-panic among thousands of insulin-taking diabetic patients. The press quoted a biochemist of international repute who, at a national medical meeting, had stated that "insulin eventually poisons the diabetic and keeps him irritable through a chemical tug-of-war in his body." Furthermore, the signed report claimed that 99 per cent of adults who have diabetes can get along without insulin and live normal, healthy lives through diet alone. The next day, telephone wires were hot with calls from diabetic patients to their physicians, the subject of conversation being self-evident. Confronted with an urgent and immediate challenge, Doctor Howard F. Root of Boston, then president of the American Diabetes Association, prepared a news release of unminced words deprecating the biochemist's claims. Since rebuttals always seem a little anticlimactic, the latter statement made the inner pages of the newspaper.

When an incurably ill person is obliged to take medicament indefinitely to sustain life — and especially if such medication must be injected into the body daily — it behooves the physician to minimize any untoward effects and

maximize the therapeutic triumph realized. Cursory reasoning may easily create the impression that in educating the diabetic patient, a physician should discuss all aspects of insulin, including the gruesome fact that it may occasionally cause irreversible brain damage or even death in excessive dosage. Mature consideration of the demoralizing impact this knowledge may have upon the patient should obviously preclude dissemination of such information. A case in point follows:

A very intelligent erstwhile surgical nurse, now married and a mother of 2 young children, had had diabetes for the past seven years. She had accepted the disease admirably and, being most conscientious in self-management, epitomized the physician's concept of an ideally cooperative patient. Unfortunately, while devoid of complications, her diabetes was characterized by definite metabolic instability. All attempts to avoid vacillating extremes of hyperglycemia and hypoglycemia were more or less futile. However, the fact that she experienced one or two hypoglycemic reactions weekly which responded promptly to oral sugar posed no problem until one day when, at a social gathering, a physician blandly admonished her that hypoglycemic reactions can cause "irreversible brain damage."

From the Department of Medicine, Grand Forks Clinic, and the University of North Dakota School of Medicine.

Read at the one hundred and sixth annual meeting of the American Medical Association, in the A.M.A. Conferences on Diabetes sponsored by the Joslin Clinic, New York City, June 3, 1957.

E. A. HAUNZ, a specialist in internal medicine, is associate professor of clinical medicine at the University of North Dakota Medical School, on the staff of the Grand Forks Clinic, and chairman of the Board of Governors of the American Diabetes Association, Inc.

eventuating in impoverished cerebration, imbecility, or death! The following day the patient appeared in my office in a state of extreme panic. Several visits were required to even partially allay her anxiety and fear. In fact, soon after the incident, she appeared in a state of ketoacidosis, probably from dual effects of anxiety and willful reduction of insulin dosage far below the therapeutic requirement. Time may never totally erase the indelible image of that remark from the patient's memory.

As the law delineates certain information transmitted from patient to physician as strictly privileged communications, so should physicians restrict certain scientific facts as privileged information, best withheld from their patients, at least for humane reasons. It may be argued that newsmongers whose sole objective is to sell their magazines or newspapers may still disseminate such information to the lay public. However, the statements of a lay "science writer" are never accepted with the same credulity that the patient accepts the word of his own physician, and, by the same token, alarmist utterances by the former can be quite effectively discounted or discredited by the latter. But, to the physician who deliberately or unwittingly discloses facts which are inimical to good patient morale, one can only say, "Caveat actor."

A critical perusal of the literature on so-called fatal cases of insulin reactions reveals that a significant number of cases are poorly documented and often unconfirmed by autopsy. In fact, Marble has wisely stated, "never blame insulin for a death unless to good clinical evidence is added the corroboration of a skillful and complete post-mortem examination!"¹ Indeed, even at postmortem, the changes ascribed to extreme hypoglycemia "are not very characteristic" and "from histologic findings alone such a diagnosis is not justifiable."² It is evident that even with meticulous clinical appraisal combined with thorough postmortem study, the conclusive diagnosis of fatal hypoglycemic shock may still be presumptive. The fact that hypoglycemic phenomena in the given subject cannot be resolved into a definitive equation of cause and effect is borne out most emphatically by the following case.

A 36-year-old bachelor whose occupation was that of an associate professor of engineering had had metabolically unstable but uncomplicated diabetes mellitus for fifteen years. Despite the fact that he was somewhat careless in his diet, inherent metabolic instability had been proved by observation under rigid conditions of control during previous periods of hospitalization. He

lived alone in an apartment. During the nine years I had been his physician, he steadfastly refused to look for a companion to share his apartment. As a result of living alone, he developed severe unchecked nocturnal hypoglycemic reactions from long-acting insulin, often reaching the convulsive level. He averaged 1 or 2 such episodes a month. Not infrequently, he lay on the floor in profound hypoglycemic coma for as long as eight to ten hours. Except when someone in the apartment house, aroused earlier by his convulsive movements, called a physician, he would not regain consciousness spontaneously until morning. Discovering that his clothes were drenched with sweat, he would take a shower, eat breakfast after a reduced dose of insulin, and pursue his day's occupation as if nothing had happened. His students did not detect any impairment in the quality of his teaching. Multiple doses of crystalline insulin had been repeatedly advised in an attempt to achieve some mitigation³ in the extremes of hypoglycemia and hyperglycemia in his case, but the patient constantly rejected the idea of taking more than 1 injection a day.

Such a case as this is unusual in at least one respect: recovery from hypoglycemic coma is commonly followed by an interval of mental aberration ranging from hours to, less often, days. Various phenomena may be observed, including an infantile behavior pattern, dysarthria, amnesia, and lassitude. The above case is cited to suggest that there must be some constitutional (or cerebral?) vulnerability in some patients which does not exist to the same extent in others.

It is well known that tremendous amounts of insulin may be given to some patients without ill effect — a phenomenon termed "insulin resistance" — which, by custom, is said to exist in any diabetic patient whose daily insulin requirement exceeds 200 units. On the other hand, a precipitous and persistent decline in the blood sugar level may be seen in so-called insulin-sensitive patients in response to relatively small doses of insulin but still devoid of ill effect or any clinical semblance of an insulin reaction. Such a case occurred in a child, aged 5, whose blood sugar value was reported most reluctantly by the laboratory as 5 mg. per cent (and rechecked)! Rushing to his bedside, I found him quite happy, playing with blocks. Needless to say, glucose and feedings were administered immediately. This is a clinical curiosity but not without precedent, for Peters and Rabinowitch⁴ reported the case of a young diabetic who had a "true" blood sugar of zero for six hours without symptoms.

Patients with "true" glucose levels of zero have been observed at times by the Joslin group but "almost invariably with symptoms of hypoglycemia."⁵

Another curiosity, less rare, is what might be termed an "insulin paradox." An insulin reaction has been variously reported to occur in the presence of a normal or even elevated blood sugar level.⁶⁻¹⁰ There are many who feel that insulin reactions are based on the rapidity of fall in the blood sugar level rather than on low values *per se*, although, in many cases, both factors may be operative. For these reasons, it has been suggested that the terms insulin reaction, insulin shock, and insulin coma replace the terms hypoglycemic reaction, shock, or coma⁶ to keep physicians mindful of the foregoing phenomena.

The precise mechanism and dynamics of the insulin reaction are still poorly understood thirty-five years after the discovery of insulin. Indeed, much of this hiatus in factual knowledge stems from our ignorance of the exact *modus operandi* of insulin itself. This is not said to disparage some highly significant experimental clinical and laboratory observations made in recent years by eminent investigators. Rather, it should be realized that our knowledge is fragmentary and does not fall into any well-focused pattern to clarify a host of complex chemical and metabolic interactions. Previous concepts of the action of insulin are now known to be naive attempts to oversimplify this enigma. In a brilliant treatise on "The Problem of the Action of Insulin," Stadie points out that we now have not only 3 competitive theories of the diabetic defect but that there are well-established observations which do not fit readily into any of these theories. Added to this "the entire interplay of other hormones, for example, pituitary and adrenal, must be integrated into a complete theory of insulin action."¹¹

This apparent dilemma does not excuse the clinician from obligatory knowledge of basic theoretic and practical aspects of the insulin reaction. Such knowledge should encompass the following:

1. A working concept of currently accepted theories of the mechanism of insulin reactions.
2. An understanding of the basic differences between reactions from long-acting and crystalline insulin preparations.
3. A keen awareness of the protean and sometimes bizarre nature of hypoglycemic signs and symptoms.
4. Ability to execute prompt and appropriate treatment for various types and degrees of insulin reactions.

CURRENT THEORIES OF THE MECHANISM OF INSULIN REACTIONS

A review of recent literature discloses unanimity of opinion in the concept that hypoglycemic symptoms stem chiefly from an indirect effect on the brain. At this point, opinions are divergent. Some believe that symptoms result from glucopenia of the brain interfering with multiple cerebral oxidative mechanisms,¹¹ while others maintain that these symptoms are the specific end result of anoxia induced by cerebral glucopenia.^{12,13} Disturbance in cerebral metabolism incident to lowered glucose content of the brain, reflected in hypoglycemic symptoms, provides a feasible explanation for the occasional patient who exhibits symptoms in the presence of a normal or even elevated blood sugar level. Conversely, when symptoms fail to occur in the presence of profound hypoglycemia, it has been suggested that the cerebral supply of glucose is adequate, because the actual cerebral metabolic requirement for this substance may be correspondingly lower in these cases.¹⁰ By controlling its own rate of consumption of glucose, the brain tissue may be able to fortify itself against a dearth of this nutritive substrate. Two most critical links in the metabolic chain are the ease or difficulty of transference of glucose from blood to the cerebral cell on the one hand, and the degree of glucose utilization within the cell on the other.¹⁴ These two "links" depend upon the phosphorylation of glucose to glucose-hexosephosphate by way of its combination with adenosinetriphosphate mediated by the enzyme hexokinase.¹⁵

The term "pseudohypoglycemic reactions"¹⁰ has been suggested for apparent "reactions" which cannot be reversed by administration of glucose by any route, but which can be prevented by the use of anticonvulsive drugs. These "reactions" should be carefully distinguished from the true insulin reaction. In such cases, electrocerebral dysfunction creates symptoms indistinguishable from those of hypoglycemia. Even inordinately depressed blood sugar levels cannot produce true epileptic seizures or an electroencephalographic pattern of epilepsy, although hypoglycemia may enhance the abnormal brain wave pattern in those with petit mal.

It should be remembered that acetylcholine is a powerful convulsant,¹⁶ and low glucose concentrations in the brain stimulate acetylcholine synthesis,^{17,18} while normal blood sugar levels exert an inhibitory effect. Acetylcholine synthesis is also inhibited by hypercalcemia.¹⁹ In turn, the latter state represses the degree of nerve cell activation by acetylcholine.²⁰

That severe hypoglycemia and, more especially, glucopenia of the brain tissue are capable of producing prolonged or even irreversible and sometimes fatal damage is a fact that should command the respect of every physician who prescribes insulin for any purpose.

BASIC DIFFERENCES BETWEEN REACTIONS FROM LONG-ACTING AND CRYSTALLINE INSULIN PREPARATIONS

The foregoing comments on the mechanism of insulin reactions are related primarily to depressive effects on the central nervous system, and these effects are most commonly observed from such long-acting insulins as protamine zinc, globin, NPH, lente, and various insulin mixtures. These reactions have been termed the "central-nervous-system-type" by Maddock and Krall.²¹ Reactions from crystalline insulin are more apt to manifest themselves as sweating, tremor, hunger, and palpitation and are usually evoked by a precipitous fall in blood sugar levels. Such reactions have been termed "adrenalin-like,"²¹ because they are believed to result from an excess of circulating epinephrine. The mechanism of increased epinephrine secretion by the adrenal medulla in response to a fall in blood sugar is obscure. It is important to remember that while many reactions may be purely "adrenalin-like" or "central-nervous-system-type," these two mechanisms frequently coexist in the same patient.

THE PROTEAN AND SOMETIMES BIZARRE NATURE OF SIGNS AND SYMPTOMS OF THE INSULIN REACTION

The physician's keen insight into the wide spectrum of symptomatology of hypoglycemia seen among diabetic patients will not only spare him needless embarrassment but protect the patient from obvious hazards as well. For reasons already discussed, reactions from crystalline insulin are nearly always readily detected, exhibiting rather clear-cut signs and symptoms with rapid onset. Glucose effects a quick dissolution of these phenomena. Contrariwise, all long-acting insulins are capable of producing an amazing variety of reactions both quantitatively and qualitatively. Many such reactions have escaped detection "even by trained medical personnel."²¹

An exemplary case, previously reported,³ is that of a 17-year-old girl with so-called "brittle" diabetes which was poorly controlled on mixtures of protamine zinc and crystalline insulin. Severe reactions were, of course, easily recognized and these alternated with frequent "spikes" of hyperglycemia—sometimes with acidosis. The clinical feature which appeared rather insidiously and defied recognition as a phenom-

enon of hypoglycemia was a gradual change in her personality from a cheerful so-called "extrovert" type to a reticent, introspective, and schizoid individual with definite "blocking" when questioned. Her mildly defective memory later aroused suspicion that insulin might be the culprit. A most dramatic return to her original personality occurred within ten days after establishing improved control on multiple doses of crystalline insulin. It was concluded that her personality changes must have resulted from reversible chronic brain damage or dysfunction from frequent reactions to long-acting insulin. She has been followed for seven years on the crystalline insulin program without recurrence of the personality disturbance.

It is clinically helpful to bear in mind that slowly developing hypoglycemia, commonly produced by long-acting insulins, may be reflected in very subtle changes in behavior, mood, or sense of perception, chiefly because there is no increase in circulating epinephrine to produce the more classical and obvious "adrenalin-like" reaction. One of the most fearful of all these subtle phenomena is simple drowsiness, not perceived by the patient himself and, indeed, unnoticed by the physician as well unless the latter is most discerning. Such patients, unaware of their reactions, are obviously a grave hazard on the highway.

A terrifying example was that of a musician, aged 34, who had been diabetic for sixteen years. He had given himself 90 units of NPH insulin daily for eleven months without reporting to his physician. He tested his urine at least three times daily and adhered to his diet. He did not drink alcoholic beverages in any form. However, his wife noted that for three weeks he had experienced frequent severe insulin reactions, without warning, manifested by rather sudden confusion during which he resisted attempts to administer glucose in any form. On March 2, 1957, he was driving home from a musical engagement about 1:30 A.M. when his car suddenly accelerated, swerving from side to side on the highway and moments later went off the road, crashing into a pole. He was instantly killed (figure 1). Meticulous investigation of this accident established beyond all reasonable doubt that it resulted from an insulin reaction. Ironically, the patient had been followed for a time by a patrol car, the officer remarking that his driving had previously been skillful and not in excess of the speed limit.

The above case points up the age-old legal problem of whether or not an insulin-taking diabetic should be granted a driver's license and



Fig. 1. Fatal accident resulting from an insulin reaction which undoubtedly set in too rapidly for conscious perception by the patient. Meticulous investigation established beyond all reasonable doubt that no other factors accounted for the catastrophe. (Photo courtesy of the Minneapolis Star and Tribune.)

under what circumstances. Recently Lister²² pointed out that "the extent to which the patient on insulin is a menace on the road is difficult to assess." When driving a car is a requisite to a livelihood, it has been my experience that many diabetics in the "road menace" class will not yield to the dictates of their conscience. Unless the law demands a detailed report from the patient's physician before granting a license, the public faces just another threat on the already too hazardous highways.

Bizarre manifestations of reactions from long-acting insulin are too numerous for detailed discussion here. It is an unfortunate fact that lente insulin, the only available long-acting insulin without a foreign protein substrate, may exhibit all the dangerous hypoglycemic potentialities inherent in other modified insulins. A most bizarre phenomenon from lente insulin was seen in a 4-year-old diabetic boy who was hysterical with formications and hallucinosis in the form of "worms crawling all over the body." The panicky child was constantly trying to brush off the worms.²³ This alarming reaction persisted for eight hours despite chemical correction of the hypoglycemia. There was total recovery without evidence of residual brain damage. In 2 adult diabetic patients, reactions from lente insulin were reported as a sudden loss of consciousness, without any aura, causing the patients to fall down.²³ No convulsions occurred. Subsequent studies failed to disclose any evidence of epilepsy. Other modified insulins produced similar reactions in these 2 patients except for a momentary warning, which enabled them to sit

or recline before losing consciousness. The following case is cited to illustrate bizarre neurologic phenomena from insulin reactions:

The patient, a 43-year-old woman, had been diabetic for eight years. She had been injecting 20 units of lente insulin daily into an insulin tumefaction site located in the upper third of the right thigh. She was admitted to the hospital, unconscious and rigid with opisthotonus. The blood sugar was 23 mg. per cent. After intravenous glucose, she regained consciousness but exhibited a transient monoplegia of the right leg, dysarthria, and horizontal nystagmus together with mental confusion. The neurologic deficits, indicating bulbopontine and corticospinal involvement, disappeared entirely within forty-five minutes.

Baker repeatedly called attention to the "varied and bizarre neurologic symptoms" in patients with hypoglycemia long before the advent of lente insulin. In particular, hemiplegia has been described from insulin hypoglycemia by Baker and by others.²⁴⁻²⁶ Both hemiplegia and hemiparesis have been reported.²⁷ That focal motor signs and symptoms seen in insulin reactions are not confined to older patients is evidenced by Baker's description of persistent aphasia and right-sided paresis in a 15-year-old schoolgirl.²⁶

These unusual reactions to lente insulin are not cited to disparage the utility of zinc insulin suspensions nor to imply that lente is inferior to other modified insulins. Indeed, it has been reported that with lente insulin, reactions tend to be somewhat less frequent and diabetic control smoother in the metabolically stable patient. It

should be the modified insulin of preference unless proved to be inferior to any of its predecessors in the given patient.

No discussion of the nature of insulin reactions would be complete without mentioning a weird group of individuals, including nondiabetics as well as diabetics, who have developed a perverted delight in surreptitiously injecting insulin to willfully induce insulin reactions. One such incredible case is that of a woman who had submitted to a total of 7 exploratory operations in vain search for a functioning islet-cell adenoma before she was discovered to be surreptitiously taking insulin!²⁸ To expose such patients, one is challenged to play the dual role of physician and "super-sleuth."

The clinician's diagnostic acumen for recognition of insulin reactions which may masquerade in such variegated forms can only be developed by experience. While it may be conceded that subtle and bizarre reactions may evade even the keenest eye, the physician who mistakenly identifies insulin coma as diabetic coma and, hence, injects more insulin cannot justify his error on any basis but incompetence. *It is infinitely less hazardous to administer more glucose to a patient in diabetic coma than to give more insulin to a patient in insulin coma!* I have rarely given an additional dose of insulin to a comatose diabetic without first obtaining a blood sugar report. The latter requires a waiting period of about thirty minutes, depending on the method utilized. While awaiting a report, the patient is given glucose for even the faintest suspicion of insulin coma. Except in cases of profound diabetic ketoacidosis and coma, exhibiting such classical signs and symptoms that immediate diagnosis and treatment are urgent and foolproof, a delay of some thirty minutes to obtain a blood sugar determination is obviously less hazardous than the risk of giving more insulin to a patient already in insulin coma.

PROMPT AND APPROPRIATE TREATMENT OF VARIOUS TYPES AND DEGREES OF INSULIN REACTIONS

Prompt treatment demands prompt recognition of the *earliest* signs and symptoms of an insulin reaction by either the patient or the physician. Of prime importance is the patient's ability to not only perceive the earliest symptoms but to actually treat himself before confusion or unconsciousness supervene. The number of diabetics whose reactions set in with such rapidity that self-treatment is impossible is far from negligible. For this reason, the physician should make every effort to observe reactions occurring in any dia-

betic patient during the initial period of insulinization. The responsibility for reducing occupational and travel hazards to a minimum in these cases rests squarely with the physician. Patients in whom severe reactions are prone to develop with little or no warning so that self-treatment is virtually impossible should be prevented from driving a car or engaging in any hazardous occupation, either of which constitutes a grave risk to both the patient and others about him. Instilling a very real fear of these potential consequences is far more humane than idle procrastination until the patient suffers the consequences of a serious accident. It is most unfortunate for society that the law (privileged communications) prevents physicians from exposing poor-risk drivers without the latter's consent.

In so-called "brittle" diabetics in whom reactions are so frequent and often severe, the first requisite in treatment may be to retrench widely from the purist objective of normoglycemia and accept the lesser of two evils between severe hyperglycemia and potentially dangerous demoralizing insulin comas. Diabetics in general, and the above patients in particular, should keep a written account of the severity, frequency, and time interval of their reactions for periodic analysis by the physician, since aggressive measures of prevention can obviate much unnecessary treatment and risk.

Appropriate treatment of the insulin reaction depends upon the type and severity and to some extent upon the specific patient. In the case of mild to moderate reactions, oral administration of 10 gm. of glucose in the form of orange juice or glucose tablets (Dextrotabs) will usually effect relief in a few minutes, especially if the reaction is from crystalline insulin. Glucose tablets are more rapidly effective than candy, such as mints, which are usually sucrose, for the simple reason that sucrose must be converted to glucose before the blood sugar rises. Another advantage, especially in children, is that glucose tablets are rather tasteless, avoiding the tempting flavor in candies. It is well known that too much glucose may frequently prove less effective than the optimum dose. Experience has revealed considerable variation in this "optimum" dose among different diabetic patients exhibiting reactions of like severity and from the same type of insulin. "Trial and error" often provides the only clue in the individual patient.

In the case of insulin coma, the intravenous administration of 50 per cent glucose nearly always evokes a prompt and most dramatic recovery, usually before 15 cc. have been injected.

Slow injection prevents painful sclerosis of the veins. If the patient in insulin coma has ingested food fairly recently, an immediate hypodermic injection of 1 cc. of 1:1000 epinephrine (aqueous preparation) is almost invariably indicated to effect rapid glycogenolysis, increasing the amount of available glucose orally. If he does not regain consciousness within ten to fifteen minutes, intravenous glucose should be given immediately. All patients must be warned to tell their friends and relatives *never to give liquids orally when they are unconscious!*

It is axiomatic that all insulin reactions should not only be treated with glucose as described, but a meal relatively high in protein and fat content should be taken to prevent a recurrence. Moreover, the patient should always consult his physician before taking the next dose of insulin after a reaction. Depending on the severity and duration of the reaction, the patient's subsequent requirement may vary from a few units less to no insulin during the next twenty-four to thirty-six hours. Such dosage should be calibrated on the basis of blood sugar determinations. Glycosuria is only a crude mirror image of the degree of hyperglycemia, and not infrequently urine tests are a totally misleading reflection of actual blood sugar levels at a given time.

Marble²⁰ states "the longer the period of an insulin reaction and the unconsciousness, the more carbohydrate is required, and in one of the fatal cases seen in consultation, 200 gm. of glucose was given intravenously and subcutaneously before the blood sugar began to rise."

Except as a last resort, I never give glucose by stomach tube to a patient in insulin coma, because these patients occasionally retain their gag reflex and vomit around the gastric tube. One such case nearly succumbed from aspiration of vomitus. Heroic measures are occasionally indicated in desperate cases of prolonged refractory coma, such as intubation, oxygen by mask, constant intravenous infusion of glucose, and even anticonvulsant drugs.

Recently, glucagon has been suggested as an effective treatment for insulin reactions which have progressed to the coma stage. In such instances, the intravenous administration of glucagon effected a rise in the blood sugar level almost as rapidly as intravenous glucose. Its action is apparently at the site of liver phosphorylase where insulin has no direct effect. Glucagon is singularly innocuous, although recently 1 case of hypotension has been reported to have occurred after an injection.³¹ The advantages of its use over glucose include decreased volume of injection (0.01 to 0.1 mg. per kilogram of body

weight), decreased viscosity, and absence of local reactions. These advantages may be weighed against its less rapid action, commercial unavailability, and experimental status at present. It would seem definitely wiser to use glucose until more conclusive data are forthcoming on this subject. Obviously, by virtue of its decidedly smaller volume, glucagon could prove most valuable in small children and others whose veins are next to inaccessible. It is only slightly less effective intramuscularly.

Prophylaxis of insulin reactions should, of course, be the keystone in the arch of treatment. A systematically organized plan of patient analysis, including living habits, diet, selection of appropriate insulin preparations, temperament, and sites and technic of insulin injection, frequently eliminates or reduces the frequency and severity of reactions. When all efforts fail to prevent unpredictable severe nocturnal reactions, an alarm clock awakening the patient at selected intervals during the night may provide the only means of protection, replacing intense fear with some peace of mind.

SUMMARY

A critical review of current concepts of the mechanism and treatment of insulin reactions has been presented and several illustrative cases have been cited. The following points are re-emphasized:

1. The gruesome fact that insulin reactions may in exceptional cases cause irreversible brain damage or death should *never* be divulged to the diabetic patient, but this potentiality should command the respect of every physician. Actually, I tell patients that insulin reactions are innocuous except for the occupational or travel hazards implicated.

2. So-called fatal cases of insulin reaction are often poorly documented and unconfirmed by autopsy. Actual proof is a genuine academic challenge. Indeed, irreversible or fatal brain damage appears to be less common than the literature leads us to believe, notwithstanding the supposition that a number of cases are never reported.

3. Insulin reactions may, in exceptional instances, bear an inverse ratio to the blood glucose level; that is, hypoglycemia may occur without reactions and vice versa.

4. The enigma of the exact mechanism of insulin reactions stems to a large extent from our ignorance of the *modus operandi* of insulin itself. Basically, most phenomena are ascribed to an indirect effect on the brain, although one component is predicated upon liberation of adrenalin.

5. The physician should not use insulin therapeutically for any purpose unless he is equipped with the following:

a. A basic concept of the current theories of the mechanism of insulin reactions.

b. Ability to distinguish the signs and symptoms of reactions due to long-acting insulin from those due to crystalline insulin.

c. Keen awareness of the protean and sometimes bizarre nature of hypoglycemic signs and symptoms.

d. Competence in executing prompt and appropriate treatment for reactions of varied types and severity.

Dextrotabs, each containing 1.66 gm. of glucose, are manufactured by Cramer Chemical Co., Gardner, Kansas.

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WHEN PRESSURE APPLIED TO THE EYE causes clumping or sludging of the blood in the retinal veins, organic disease should be suspected in patients who are not pregnant or menstruating. The sign is particularly useful in arousing suspicion of organic disease in patients with few or unconvincing symptoms.

The vessels of the optic disk are viewed through an ophthalmoscope while the lateral aspect of the upper eyelid is pressed with the thumb just firmly enough to produce partial diastolic collapse of retinal arteries without distorting the eye. If the sign is positive, blood in the retinal veins becomes granular, then forms large discrete particles within five to eight seconds. After prolonged pressure, slight granularity may appear in healthy persons, particularly in menstruating women.

Of 90 patients with sludging, 79 had definite organic diseases; active tuberculosis and carcinoma were the most common diagnoses. Cirrhosis, bronchiectasis, myelomatosis, unexplained fever, pneumonia, and rheumatoid arthritis were also seen. Of the 11 patients for whom no disease was detected, 2 were pregnant and 1 was menstruating. Erythrocyte sedimentation rate was elevated in 62 patients and serum globulins were above normal in 55.

Sludging was not observed in 31 healthy persons or in 150 patients with diseases including functional disorders, peptic ulcer, chronic bronchitis, and spondylosis.

P. J. D. SNOW, M.D., Manchester University, England. *Lancet* 272:65-66, 1957.

Tonometry in Glaucoma Diagnosis by Senior Medical Students

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WITH THE INCREASING LONGEVITY in recent years, we are seeing more patients with geriatric eye problems. One of these is chronic simple or simple glaucoma. This condition is difficult to manage, and early diagnosis is crucial if we are to try to prevent progressive field loss and eventual blindness. Our most reliable early clue comes from routine and repeated tonometry. In the first six months of 1955, 6 senior medical students at the University of Minnesota Medical School found extra time to do tonometry on 684 patients. This was done voluntarily and started one day when 1 of the 6 doubted the recognized 2 per cent incidence of undiagnosed simple glaucoma in the United States today in people 40 years of age and over.¹⁻⁴ The students set out to learn tonometry and check the incidence in their patients.

Three groups of 2 each were formed. Each group was equipped with a new standardized certified Schiøtz tonometer, a dropper bottle of ½ per cent Pontocaine, a dropper bottle of 1:2500 aqueous Metaphen, and a small bottle of technical ether for cleaning the tonometer. Preparation of the groups included description of the tonometer and tonometry. The groups were given printed cards as illustrated for recording results.

Name Sex Age Hosp. No.
Date Service Diagnosis

TONOMETRY:

	Scale Div.	Mm. Hg (Schiøtz)	Weight	Time (a.m./p.m.)
Right eye				
Left eye				
History of any eye disease past or present treated by eyedrops or operation:				
Team				
Name				

After 40 inpatients were checked at University of Minnesota Hospitals, the teams looked around for future patients on whom to measure tension. One team arranged to work during their noon hour in a back room of the eye clinic at

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University Hospitals. In this way and through the cooperation of the outpatient medical clinic and the ophthalmology clinic personnel, this team measured intraocular pressure on 453 outpatients. The other 2 teams, unfortunately, did not find as smooth a setup. Forty patients initially checked at University Hospitals were negative. They succeeded in measuring 191 additional patients at Minneapolis General Hospital outpatient medical clinic. Of these, 6 had tensions above 30.

RESULTS

Data are most complete and available on the 453 outpatients at University Hospitals, and we shall limit the report to these. Patients whose intraocular pressure was 30 mm. mercury or over on the survey, or who showed a difference of 10 mm. mercury or more between the 2 eyes, were given appointments at the University of Minnesota Hospitals eye clinic for further investigation. Thus, 21 patients were singled out. Careful history, ophthalmologic examination, ophthalmoscopy, peripheral and central visual field studies, repeated tonometry, and water drinking tests were performed. Of these 21 patients, 8 were definitely positive and 5 were definitely negative. Three were suspected positive, having either a positive tension in the workup, positive field, or positive water test. Four were questionable, having no workup but positive tension on survey. One 73-year-old man was excluded from the study when a metastatic recurrent bowel malignancy was diagnosed.

CONCLUSIONS

In this relatively small series of 453 outpatients, if we include the 3 suspected positives, we found an incidence of 2.4 per cent undiagnosed simple glaucoma. If only the definitely positive cases are included, the incidence is 1.76 per cent. Our skeptic says he feels more convinced now about the incidence. Most important is the positive diagnosis of 11 patients with glaucoma from a suspect group of 20, who were screened out of 453 outpatients by tonometry in

the hands of 2 interested senior medical students. Tonometry is an examination procedure that is speedy and harmless. No cases of drug sensitivity or later corneal complaint were encountered. Senior medical students can learn to screen out glaucoma patients with the accuracy shown in this survey. Of all the available diagnostic methods we have today, routine and repeated tonometry still gives the most reliable clue. Senior medical students, interns, residents, and the staff on all services should realize the importance of 1,000,000 undiagnosed cases of simple glaucoma in the population of those over 40 in this country today.¹ Tonometry should be done as part of a general physical examination. All too often a tonometer is used to verify that which is palpated instead of being used to detect what the fingers cannot feel. This procedure should be taught to seniors and should become part of a university hospital's physical examination for ev-

ery patient 40 years of age and older. It should be routinely performed by ophthalmologists, too. One of the definitely positive patients had already been through an eye clinic where no tonometry had been done, and glaucoma was later diagnosed only after referral back by the senior student. Therefore, it is much better for a tonometer to be used by a medical student or a general practitioner than to lie untouched on the shelf of an ophthalmologist.

The men who made up the survey groups are: Kermit John Halverson, William R. Hilgedick, Arndt John Duvall, Richard B. Ellingson, Donald Willard Herrick, and John Joseph Hall.

We are grateful to and wish to thank Mr. Ray Nelson of Benson Optical Company for furnishing the tonometers for use in this study. I wish to thank Dr. Erling W. Hansen, head of the Department of Ophthalmology, University of Minnesota Medical School and Hospitals for his helpful suggestions in this study and report.

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AMAUROSIS FUGAX caused by temporary interruption of retinal blood flow without cerebral or systemic hypotension is notable by recurrent episodes of blindness, usually unilateral, which begin suddenly and persist for only a few seconds or minutes.

Blindness that persists longer than thirty minutes, with subsequent complete recovery, is probably a functional disorder rather than true amaurosis fugax, since ischemia for such a long period would almost certainly permanently damage the retinal ganglia. Loss of vision may recur several times a day or at intervals of a month or more. Blindness may be total or may involve a sector of the visual field.

Sometimes, the attacks cease spontaneously; in other instances, blindness persists for longer than usual and vision is not completely recovered. Ophthalmoscopic examination of such cases reveals ischemic retinal infarction or neuroretinopathy.

Diagnosis of amaurosis fugax must usually be made from the patient's description of the attacks, since ophthalmoscopic examination during the actual blindness is rarely possible.

The cause of retinal ischemia should be ascertained and treatment instituted to reduce the likelihood of permanent blindness. Migraine, retinal artery spasm associated with local retinal vascular disease or with carotid artery lesions, Raynaud's disease or a similar syndrome, or temporal or cranial arteritis may be responsible. Examination of the ocular fundi between attacks often reveals atherosclerosis or emboli in the retinal artery. In a few instances, no causative lesion can be discovered.

Therapy depends upon the underlying disease. Anticoagulants should be given if carotid artery disease is responsible. For temporal arteritis, cortisone should be given.

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Purpura in Childhood

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PURPURA in its various forms is one of the most frequently seen hematologic disorders of childhood.^{1,2} The course and prognosis differ somewhat from that of the disease in adults.

In the last five years, 23 hospitalized patients with primary thrombocytopenic purpura and nonthrombocytopenic purpura have been treated by the Pediatric Department of the Fargo Clinic and St. Luke's Hospital. Of these, 9 cases were thrombocytopenic and 14 were nonthrombocytopenic. No cases secondary to leukemia, aplastic anemia, or infections, such as sepsis or meningitis, are included. These figures do not present a true picture of the incidence of these conditions, as there were numerous cases not ill enough to require hospitalization.

The bleeding in both types of purpura is from the small blood vessels: capillaries, arterioles, and venules, whether the defect is in the platelets or in the integrity of the blood vessels. Therefore, bleeding in purpuric diseases is in the form of petechiae, purpuric spots, or small ecchymoses. With the exception of epistaxis or bleeding into the bowel, blood loss is usually not great. In contrast, in conditions in which there is a defect of coagulation, as in hemophilia, the bleeding takes the form of large extravasations, such as hematomas, hemarthroses, and massive hemorrhage.

In the workup of a suspected case of purpura, several laboratory tests are helpful: a complete blood count with stained smear, platelet count, bleeding time, coagulation time, tourniquet test, and, sometimes, a bone marrow examination. These tests should serve to rule out other types of bleeding diseases and establish the type of purpura. Sepsis, meningococcemia, drug poisoning, and so forth can be separated out by the clinical picture. A bone marrow examination, while of value in ruling out leukemia and aplastic anemia, does not usually give a picture that is characteristic of thrombocytopenic purpura.

although some believe there is an alteration in the number and morphology of the megakaryocytes.

THROMBOCYTOPENIC PURPURA

The etiology of primary thrombocytopenic purpura is not settled. It has been suggested that platelet agglutinins are found in these patients, and the spleen removes the damaged platelets from the circulation. There is often a history of allergy in the patient or his family, and preceding infections occur in a large percentage of cases.

In our patients, there were 9 cases of thrombocytopenic purpura (table 1). The age ranged from 1 to 11 years. In most cases, the initial symptoms were petechiae and small ecchymoses which occurred with slight trauma. Three patients had epistaxis, 1 had bleeding after removal of a tooth, 1 had hematuria, and 1 had intracranial bleeding. In 6 cases, there was a history of recent infection or infection was still present at the onset of purpura. These infections were mostly respiratory but included mumps and German measles in single instances.

The platelet count was, of course, reduced in all cases, but the platelet level is not a good indicator of the tendency to bleed. It may be quite low, particularly after splenectomy without any clinical bleeding.

In this group, the only death that occurred was that of a mongoloid child. She died suddenly five days after admission when she had seemed to be improving. At autopsy, hemorrhages were found in the pituitary and brain stem. Intracranial hemorrhage is usually quite rare in purpura but, of course, is a most dangerous complication.

Only 2 splenectomies were done in this group of patients. One was performed on a 6-year-old girl who had been having severe symptoms for two months and had become quite anemic. Postoperatively, the platelet level rose promptly, and bleeding ceased. She has remained well since. In the other patient, platelets did not increase after splenectomy, but the bleeding tendency

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TABLE 1
THROMBOCYTOPENIC PURPURA

<i>Patient</i>	<i>Age</i>	<i>Platelets</i>	<i>Previous illness</i>	<i>Duration</i>	<i>Course</i>
N. W.	8 yr.	30,000	Nephritis	5 yr. +	Splenectomy. Still has low platelets. Clinically improved.
J. N.	6 yr.	70,000	none	2 mo.	Splenectomy. Recovered.
J. T.	11 yr.	44,000	none	6 days	Recovery spontaneous.
E. B.	1 yr.		none	10 days	Recovery. Cortisone.
V. J.	5 yr.	72,000	Mongolism and German measles	5 days	Expired. Hemorrhage in pituitary and brain stem.
D. O.	6 yr.	75,000	Upper respiratory infection	2 mo.	Recovery spontaneous.
N. B.	6 yr.	20,000	Mumps, upper respiratory infection and otitis media	2 wk.	Recovery spontaneous.
S. A.	8½ yr.	29,000	Upper respiratory infection	2 mo.	Recovery spontaneous.
R. L.	5½ yr.	24,000	Tonsillitis	2 mo.	Recovery spontaneous.

gradually improved. The other patients had a benign course and recovered in two months or less. This is true in the great majority of cases of childhood purpura. A few children were given steroids, but most of them recovered spontaneously. Most authors agree that splenectomy should be reserved for chronic cases that have been observed for some time. In fulminating cases with unusually severe symptoms and danger to life, splenectomy also may be considered. The results of splenectomy are by no means uniformly favorable. About 60 per cent can be expected to have a lasting remission, and some of the others may be improved.

Case summary. N. W., a 9-year-old girl, was seen first on June 22, 1951. The complaints were epistaxis, bleeding from the mouth, and petechiae for the last two weeks. In April 1951, she had been hospitalized for nephritis. On examination, she had many petechiae, larger ecchymoses, and hemorrhagic blebs in the mouth. The spleen was not enlarged. The hemoglobin was 10.4 gm., and the platelet count was 34,000. She was given a course of ACTH with only slight improvement and was discharged from the hospital on July 4. During July, she was given a course of cortisone without improvement. On July 26, she was readmitted to the hospital and given 2 transfusions and another course of ACTH. She continued to have many petechiae and a low platelet count for the next few months. A splenectomy was done on November 16, 1951. No dramatic improvement occurred and the platelet count remained at low levels, but there was a decrease in the number of petechial hemorrhages. She was hospitalized from December 21, 1952, to February 11, 1953, with an attack of rheumatic fever accompanied by carditis. During the acute febrile phase of the disease, the platelets rose to normal levels, 282,000, for the first time. With convalescence from rheumatic fever, they fell to the former low levels of around 30,000 per cubic millimeter. She gradually convalesced from the rheumatic attack but retained evidence

of mitral and aortic disease. She has since been kept on penicillin prophylaxis. The number of petechiae has gradually decreased. She went back to school in the fall of 1953 and has experienced no further rheumatic episodes. She reached puberty and began to menstruate in the spring of 1954. The first two periods were rather scanty, but she was hospitalized on July 4, 1954, because of excessive menstrual bleeding. At this time, she had only a small number of petechiae. She was given several transfusions, and the hemoglobin was kept above 9 gm. despite very pronounced menstrual bleeding. On the supposition that the excessive menstrual flow was due to juvenile endometrial hyperplasia, rather than thrombocytopenic purpura, a diagnostic dilatation and curettage were done, and endometrial hyperplasia was found. The menstrual disorder was controlled by a course of endocrine therapy. Since then, her periods have been moderately profuse, but she has had no trouble. There have been no petechiae in the last two years except when she has a respiratory infection. The platelet count has remained low, the last being 25,000. However, 4 teeth were recently extracted without incident.

NONTHROMBOCYTOPENIC PURPURA

Nonthrombocytopenic or anaphylactoid purpura is a generalized vascular disease thought to result from a state of hypersensitivity affecting primarily the epithelium of the small blood vessels. There is often a history of preceding upper respiratory infection, and it may be that infection is the stimulus to autosensitization. Some believe the process is analogous to other diseases of hypersensitivity, such as rheumatic fever.

There were 14 patients in this series with nonthrombocytopenic purpura (table 2). The eruptions were mostly petechial, but some had mild ecchymosis. The petechial eruptions showed a strong tendency to occur, at least at first, on dependent parts of the body; the legs and buttocks.

Five patients had Schönlein's syndrome characterized by swelling of the joints or periarticular structures and joint pains. Two had abdominal pain, vomiting, and bloody diarrhea, typical of Henoch's syndrome. One patient had both abdominal and joint symptoms, and 6 had neither. All of the patients except 1 had infection either before or at the onset of the purpura. The infections were mostly upper respiratory, but 1 had a lung abscess. In 1 case, the purpura started soon after a DPT injection, but this patient also had an upper respiratory infection. In 1 case, the inciting factor was thought to be insect bites. After having what seemed to be typical anaphylactoid purpura, rheumatic fever with a mild carditis developed in 1 patient. The platelet counts were not, of course, decreased in any case but were definitely increased, 350,000 to 550,000, in 4 cases.

In most of the patients, the course of the disease was quite brief, lasting only a few days or weeks. They recovered in a short time without sequelae. However, 3 patients had large amounts of albumin, red cells, and casts in the urine. None had hypertension. Of these patients, 2 had Schönlein's syndrome with joint symptoms and the other had Henoch's syndrome with abdominal symptoms. One boy continued to have red cells in the urine in abnormal amounts for eight

months, and another who was out of school for one year had albuminuria for seven months. The other girl was not observed long enough to determine the duration of urinary symptoms.

These children evidently had the type of nephritis associated with anaphylactoid purpura. The prognosis of this type of renal disease is in some dispute. Some authorities hold that it is benign and self-limited, while others feel it may revert to a latent state and be a cause of chronic renal disease in later life.³ The incidence of renal disease associated with anaphylactoid purpura has been reported as varying from 25 to 40 per cent. In this small series, it is 22 per cent.

Case summary. D. S., an 8½-year-old boy, was admitted on September 17, 1954. The complaints were vomiting and rather severe abdominal pain of a few days' duration. Physical examination showed a red throat, and the abdomen was soft with tenderness in both upper quadrants and around the umbilicus. He continued to have severe abdominal pain with vomiting which contained flecks of blood. On September 21, the vomiting and abdominal pain stopped and a mild purpuric rash developed on the feet and ankles. On September 22, the hemoglobin was 12.4 gm., white count 10,950, sedimentation rate 38 mm. in one hour, platelets 338,000, and the bleeding time was three minutes, thirty seconds. The urine was negative while he was in the hospital. On September 22, he was discharged with a diagnosis of anaphylactoid purpura. On September 28, he was seen again in the office. He had no petechiae or abdominal pains, but the urine showed 4+ albumin, 15 to 20 hya-

TABLE 2
NONTROMBOCYTOPENIC PURPURA

Patient	Age	Joints	Abdominal symptoms	Previous illness	Urinary findings	Duration	Course
S. S.	21 mo.	O	O	Upper respiratory infection	O	4 days	recovery
P. K.	8 mo.	O	O	Lung abscess	O	7 days	recovery
B. K.	3 yr.	+	O	Upper respiratory infection	O	7 days	recovery
R. H.	3 yr.	O	O	Upper respiratory infection	O	8 mo.	recovery
D. L.	20 mo.	+	O	Upper respiratory infection	O	1½ mo.	recovery
S. G.	22 mo.	O	O	Upper respiratory infection	O	5 days	recovery
M. L.	6½ yr.	+	O	Upper respiratory infection	O	7 days	recovery
D. S.	8 yr.	O	+	Upper respiratory infection	+	10 days	nephritis
C. M.	3 yr.	+	+	Upper respiratory infection	O	2 wk.	recovery
D. N.	7½ yr.	+	O	Upper respiratory infection	+	9 wk.	nephritis
D. K.	4 yr.	+	O	Insect bites	O	1 wk.	recovery
S. H.	14 mo.	O	O	Upper respiratory infection	O	10 days	recovery
B. R.	7 yr.	+	O	Tonsillitis and rheumatic fever	O	2 wk.	recovery
R. H.	2 yr.	+	O	Pharyngitis	+	1 wk.	nephritis

line casts per high-powered field, and 1 to 2 red cells per high-powered field. He was never hypertensive. Later urinalyses continued to show albumin, casts, and, later, large numbers of red cells. The sedimentation rate continued to be elevated at around 50 mm. in one hour. The urine showed albumin for seven months. The child did not look well and was kept out of school for the year of 1954 and 1955. Since then, he has seemed well and the urine has been negative, but the sedimentation rate has continued to be abnormal with readings around 30 mm. per hour.

SUMMARY AND CONCLUSIONS

1. Purpura, particularly the anaphylactoid type, is common in children.

2. Both types of purpura are usually preceded by infection, often of a mild nature. Both are,

in most cases, benign and subside spontaneously in a few weeks.

3. Thrombocytopenic purpura in children is usually an acute, benign self-limited condition. Only a small percentage of cases become chronic. Splenectomy should be considered only after several months of observation in chronic cases or, rarely, in fulminating cases which are a threat to life.

4. Anaphylactoid purpura is usually benign and self-limited. It usually subsides spontaneously, although steroids may shorten the course. A certain percentage of cases are accompanied by nephritis. The seriousness of this type of nephritis is questionable.

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AN ACUTE YELLOW EXANTHEM resembling scarlet fever may occur without beta hemolytic streptococcal infection of the throat. The condition is notable by fever, sore throat, and generalized, finely papular, bright red erythema on the trunk, neck, and extremities. Onset is abrupt, and rash appears within twelve to forty-eight hours. Nausea, vomiting, and abdominal pain sometimes occur. The throat is beefy red, edematous, and covered with a mucopurulent exudate. The uvula and soft palate are edematous and may be dotted with petechiae. The tongue is moderately coated and swollen.

Children remain alert and active, but adults may be incapacitated by malaise and weakness for twenty-four to forty-eight hours. Recovery is complete within ten days after onset. Treatment with aspirin, penicillin, or tetracycline does not influence the course.

This condition may simulate scarlet fever, German measles, Boston exanthem, erythema infectiosum, or infectious mononucleosis. However, group A beta hemolytic streptococci cannot be cultured from throat smears. With German measles, rash first appears on the face, and the posterior occipital nodes are enlarged. Generalized lymphadenopathy occurs with infectious mononucleosis, and the heterophil antibody test is positive. Boston exanthem may be differentiated by isolation of organisms cytopathogenic for tissue cultures and finding of a neutralizing antibody response. Rash observed with erythema infectiosum does not resemble that of the new exanthem.

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The Problem and Management of Recurring Parotid Tumors

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TUMORS OF THE PAROTID GLAND, as a group, have had a notoriously high rate of recurrence. In some respects, this is surprising, since mixed tumors, generally considered benign, comprise more than 70 per cent of the tumors of this gland. Excision of benign tumors elsewhere in the body is usually followed by cure. Kirklin and associates,¹ in 1951, reported a study of 986 cases of parotid tumor encountered at the Mayo Clinic from 1907 to 1944. Approximately a third of the patients had received surgical treatment for their parotid tumors prior to registration at the clinic. A previous operation had been performed on 33 per cent of the patients with mixed tumors, 28 per cent of the patients with Warthin's tumors, and 28 per cent of the patients with simple cysts. The recurrence rates for mucoepidermoid tumor and cylindroma, both tumors with a low to moderate degree of malignancy, were 52 and 44 per cent, respectively.

Recurrence rates for lesions of a higher degree of malignancy were as follows: 53 per cent for adenocarcinoma, 73 per cent for undifferentiated carcinoma, 50 per cent for undifferentiated sarcoma, and 54 per cent for squamous-cell carcinoma. These figures indicate that in roughly a third of the cases of benign parotid tumor and in half to two-thirds of the cases of malignant parotid tumor previous surgical treatment had been attempted with unsuccessful results. Frazell² and others^{3,4} have reported similar figures.

In a study being carried out at the present time in which 779 patients with parotid tumors were operated on at the Mayo Clinic between 1945 and 1955, inclusive, the percentage of patients who had previous operations is similar to that in the series of Kirklin and associates.¹

The high rate of recurrence after primary surgical treatment of parotid tumors might be attributed to 3 factors: (1) nature of the tumor, (2) attitude of the physician, and (3) attitude of the patient.

FACTORS WHICH MAY INFLUENCE RECURRENCE

Nature of the tumor. Malignant tumors of the parotid gland behave in a manner similar to that of malignant lesions elsewhere in the body. They do not have a capsule, and they spread by infiltration into the adjacent parotid tissue, the perineural planes, and the tissue surrounding the parotid gland. Cylindromas, adenocarcinomas, squamous-cell epitheliomas, and mucoepidermoids spread to regional lymph nodes. Pulmonary metastatic lesions are found in patients with cylindroma and adenocarcinoma. With these lesions, therefore, surgical treatment must be early and radical if it is to be curative. Mixed tumors of the parotid gland do not have a true capsule, are usually irregular in outline, and have pseudopods projecting from the main mass. Multiple tumors are rarely found in the parotid gland when it has been totally removed for a mixed tumor which has not been operated on previously. In cases of recurrent parotid tumor, multiple areas of mixed tumor can be found in the parotid gland, the subcutaneous tissue, and regions adjacent to the site of previous operation. These multiple lesions are the result of incomplete removal of the tumor or seeding of the tumor in the operative region. Early and adequate removal of a mixed tumor by superficial or total conservative parotidectomy should prevent such persistence of mixed tumors.

Attitude of the physician. The fear of damaging the facial nerve has been paramount in the minds of surgeons dealing with lesions in this region. Therefore, the physician frequently has hesitated to recommend treatment for a parotid tumor or the surgeon has not removed the tumor completely or has gone out of his way to preserve the nerve, in many instances to the point of jeopardizing that which he is trying to accomplish.

The well-trained surgeon should not have difficulty in carrying out adequate surgical procedures on the parotid gland and in preserving the facial nerve, when indicated. The physician who is not prepared to do this should not temporize with these lesions. Office operations and inci-

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sional biopsy should be condemned. We do not favor needle biopsy of parotid tumors, since positive evidence does not preclude removal of the tumor, and negative evidence must be considered inadequate. We prefer an adequate excisional biopsy consisting of removal of the tumor by superficial or total conservative parotidectomy. If, in the course of the dissection, the character of the tumor is questionable, biopsy can be performed on a specimen removed directly from the tumor. Facilities for making fresh frozen sections must be available so that immediate histologic study of the tumor can be carried out. If a specimen of a parotid tumor is to be obtained by surgical measures, the surgeon should be capable of performing an adequate and definitive operation. As is true in other fields of surgery involving tumors, the first surgical attempt offers the golden opportunity for cure of the patient. If the tumor is benign, then the facial nerve can be spared. For most malignant tumors, the nerve necessarily has to be sacrificed.

Attitude of the patient. Most patients are too willing to accept advice which reflects the attitude that "the tumor is not bothering you, so why bother it," or the "wait and see" approach. Some patients are unwilling to seek advice for fear of learning the truth. Others, after sound consultation, are unwilling to proceed with the treatment because of the risk of cosmetic deformity if the facial nerve must be sacrificed.

The potential hazards of tumors of unknown type situated in the parotid gland must be discussed with the patient. Because of the possibility that a tumor is malignant, before the operation, the patient should be prepared for sacrifice of the facial nerve if necessary. If properly informed, the patient usually will accept the possibility of facial paralysis, realizing that if a malignant tumor is not removed, it will subsequently destroy the nerve and finally result in death.

TREATMENT

The diagnosis of a recurrent parotid tumor usually can be made quite easily. History of previous treatment can be obtained from the patient or his physician. Tissue removed at the previous operation or microscopic slides of the tissue are often available for study. As a rule, the histopathologic diagnosis is known. The clinical findings are usually obvious, and the problem is not one of diagnosis, but rather, in many cases, one of determining the type and extent of treatment to be used. The criteria for operability of a recurrent parotid tumor may vary from medical center to medical center and from surgeon to surgeon. Generally speaking, we do not use

the term "inoperable" until full consideration has been given to all aspects of the case. The final decision depends on the experience, training, and philosophy of the individual surgeon.

The question of whether or not to operate on a patient with a locally recurring parotid tumor can be solved by careful consideration of 3 factors: (1) the microscopic nature of the tumor, (2) the local and distant extent of the tumor, and (3) the general condition of the patient. As a rule, we would not reoperate on a patient with recurring undifferentiated carcinoma, highly malignant adenocarcinoma, or squamous-cell epithelioma if an honest and competent attempt to remove the tumor had been made previously. This would be true especially if the recurrent tumor was bulky, if local infiltration was widespread, or if the tumor extended into deep structures of the head and neck. In such a situation, some form of external or interstitial irradiation would be the treatment of choice. Usually, however, external irradiation alone has little effect, if any, on parotid tumors. Interstitial irradiation, on the other hand, if it includes the entire region involved by the recurrent carcinoma, may destroy the tumor. However, if the recurrent lesion is highly malignant and is localized, for the most part, to the region of the parotid gland and not attached to the deeper structures, then radical total parotidectomy, with sacrifice of the facial nerve, is justified. In general, in such a case, radical neck dissection should be carried out at the same time, with removal of the neck structures en bloc with the total parotid gland.

In cases of recurrent parotid tumors of low-grade malignancy, such as cylindromas and mucoepidermoids, total parotidectomy should be performed unless the lesion is extensive. The facial nerve should be sacrificed; however, a portion of it might be saved if the tumor is some distance from all parts of the branch. Frazell² believes that a neck dissection should be considered in cases of recurrent malignant tumor whether or not metastatically involved cervical lymph nodes can be demonstrated clinically. We prefer to remove the infraparotid, subparotid, and upper, deep jugular nodes with the parotid gland. Neck dissection is done only if one or more of these nodes contains metastatic deposits.

Involvement of lymph nodes is seen in 10 to 30 per cent of patients with low-grade malignant tumors and in 40 to 50 per cent of patients with high-grade malignant tumors. Thirty per cent of patients with cylindroma will have pulmonary metastatic lesions. About 10 per cent of the adenocarcinomas will metastasize to the lungs.

In the presence of a slowly growing, recur-

rent tumor of the parotid gland, the surgeon is justified in removing the ear, the mastoid, a portion of the mandible, or other adjacent tissue if, in so doing, he is able to circumvent the tumor. Even in the presence of pulmonary metastatic lesions from a cylindroma, resection of the primary lesion is justified in order to relieve the patient of severe pain and the distaste associated with a foul, ulcerating local lesion. Pulmonary metastatic lesions from cylindroma are notoriously slow to cause symptoms, and the patient may live many years in relative comfort.

Patients with recurrent mixed tumors of the parotid gland are always candidates for further operations. These lesions are benign and, if they are adequately removed, they will not recur. A few of these tumors, however, will undergo carcinomatous transformation and then treatment must be the same as for malignant tumors. Because pathologists occasionally consider a cylindroma a mixed tumor, the surgeon and patient are lulled into a sense of false security.

It is rarely necessary to sacrifice the facial nerve in removing a recurrent mixed tumor. An adequate incision, usually an inverted T or Y incision in front of and below the ear, should always be used. The previous incision and operative site should be removed en bloc with the superficial portion or total parotid gland so that all areas of seeding or recurrence are included. The nerve, as previously reported,⁵⁻⁷ is best approached by an incision medial and deep to the mastoid process, so that the main trunk of the nerve can be identified as it leaves the styloid foramen. The 2 divisions and 5 major branches, that is, the temporal, zygomatic, buccal, mandibular, and cervical branches, are then isolated as the portion of the parotid gland superficial to the nerve is dissected and freed. If a portion of the mixed tumor is in the deep part of the gland, it can be removed from beneath the nerve and the procedure can be completed as a total conservative parotidectomy which differs only from a radical parotidectomy in that the nerve is not sacrificed. Occasionally, it is difficult to separate the branches of the nerve from the adjacent parotid tissue because of the proximity of the tumor or because of a scar. However, a branch of the nerve rarely has to be sacrificed.

In the past, a combination of electrodissection

and surgical diathermy was used in many cases of recurring parotid cylindroma and mixed tumor. This treatment was frequently combined with interstitial irradiation and often proved to be quite satisfactory except for subsequent hemorrhages caused by open wounds and delayed healing and sequestration. Because of these objections and the ease and safety with which more radical dissection by the cold knife can be accomplished with modern surgical aids, electro-surgical methods are now used much less often.

When parotidectomy has necessitated sacrifice of the facial nerve, immediate grafting of the nerve should be considered if the operation has been definitive and if nerve stumps remain. The technic of this procedure has been described recently.⁵ Information indicates that good facial function can be expected twelve to eighteen months after parotidectomy and grafting.

The cosmetic deformity can be reduced by other means, such as transplantation of the nerve and grafting of fascia lata. Secondary plastic procedures are usually delayed a year or longer to make certain that the tumor does not recur. Transplantation of the spinal accessory nerve requires re-education of the muscles, and facial grafts reduce the obvious deformity of the face but do not establish muscular function.

In the past, skin grafting, when necessary, was a late or delayed procedure, and a multiple-staged type of pedicle grafting was often used to cover defects that followed surgical diathermy and some form of radiation therapy. Today, a sharp knife dissection leaves a clean wound and makes possible the immediate application of split-thickness free grafts after radical resection of the tumor and adjacent tissues.

CONCLUSIONS

Only time will tell whether radical surgical procedures will increase the salvage rate of patients with recurring parotid tumors. Left untreated, these patients face a life of considerable pain, the presence of a foul necrosing tumor, facial paralysis, starvation, and death. Therefore, they should be treated as radically as the type of tumor indicates, hoping that many will be spared discomforts of the incurable. The real answer to the problem of recurrent parotid tumors lies in their early and adequate primary treatment.

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Emergency Treatment of Chest Injuries

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A PROPER APPROACH to the emergency treatment of the patient with a chest injury is physiologic and aimed at maintaining adequate respiration and circulation. The fact that the patient has survived removal from the place of his accident to a hospital usually indicates that his injury is not so devastating as to be hopeless.

The first step in the management of the injured person is to make sure of an unobstructed airway. The mouth and pharynx should be inspected for vomitus, blood, or dislodged teeth if the patient is unconscious or respiration is noisy. In general, noisy breathing is obstructed breathing. After clearing the airway, it must be determined that there is not an open wound in the chest. An open or sucking wound (figure 1) is covered at the end of expiration, first and most quickly, with the palm of the hand. Then a bulky, occlusive Vaseline gauze dressing or a dressing fashioned of rubber cut from a surgical glove and taped in place over the hole is substituted for the hand. A tension pneumothorax may be present and can be detected by percussion and auscultation of the chest supplemented by the simple maneuver of palpation for a shift of the trachea. This condition must be relieved at once and can be done by introducing a large gauge needle or preferably a No. 16 F. catheter into the involved hemithorax with a length of connecting tubing attached and dropped beneath a water seal at a lower level than the patient, lest water be siphoned into the chest (figure 2). The administration of oxygen with a portable tent, BLB face mask, or a nasal catheter is begun. The chest wall and diaphragm should be thought of as a bellows. The bellows function of the chest in every patient with a thoracic injury is impaired by any one or a combination of events, such as pain, paradoxical motion of an unstable portion of the chest wall, or obstruction of the lower respiratory passages by copious tracheobronchial secretions or blood. Intercostal nerve

block with 1 per cent Novocain can be performed quickly to relieve pain effectively. Morphine is dangerous because it depresses respiration and the cough reflex, which leads to atelectasis, hypercapnea, and anoxia. External pressure adequately applied eliminates the paradoxical motion of a portion of the chest wall until more definitive measures can be undertaken. Endotracheal catheter suction or bronchoscopy clears tracheobronchial secretions (figure 3). Occasionally, insertion of an endotracheal tube will have to be considered. If a serious problem with secretions develops, we do not hesitate to perform a tracheotomy. This renders the mechanical cleansing of the lower respiratory passageways easy. It also decreases the resistance to breathing in both phases of respiration and reduces anatomic dead space, making for more effective utilization of tidal air.

Simultaneous with efforts aimed at insuring adequate respiratory function, practical measures

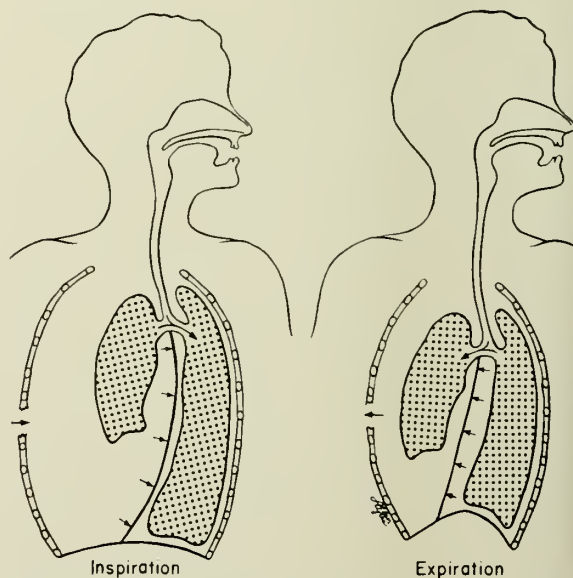


Fig. 1. Diagram of "sucking" chest wound open to atmosphere. Arrows indicate direction of air flow and motion of mediastinum. Note that ventilation is reduced in both lungs and not just on the side of the open chest wound.

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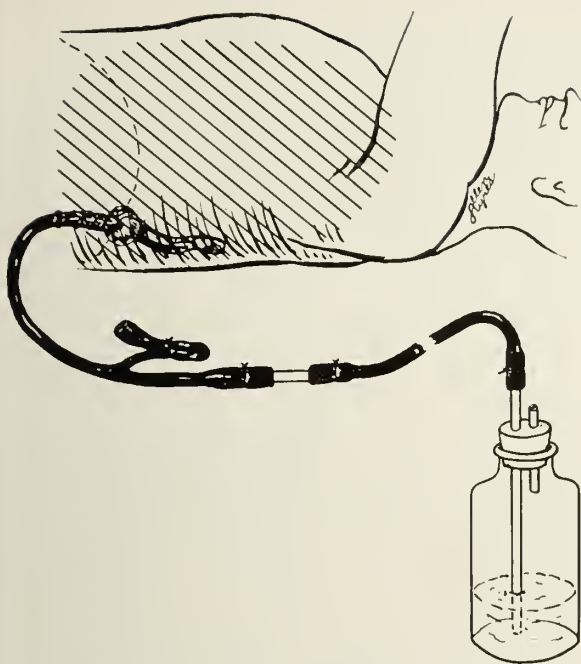


Fig. 2. Routine subaqueous catheter drainage for blood or serum. Note that all connections are tied securely. The level of the bottle must be below the patient at all times. For pneumothorax, the drainage site is usually the second anterior interspace.

to combat shock and maintain adequate circulation must be undertaken. In this regard, oversimplification is justified because it saves lives; decreased blood pressure means decreased circulating blood volume, and its treatment is the vigorous and rapid transfusion of whole blood. An infusion of plasma or a synthetic plasma expander should be started at once, and blood should be drawn through the same needle for typing and crossmatching.

After these initial steps have provided, at least temporarily, adequate respiration and circulation, then a history should be taken from the patient or witnesses to the injury. A rapid but thorough physical examination is done. There is often associated trauma to the head, neck, extremities, or abdomen which must not be overlooked. A minor surgical kit of the type found in every emergency room plus local anesthesia permit rapid suture of stab wounds or debridement of gunshot wounds of lesser extent. Tetanus prophylaxis is administered, and the initial dose of antibiotic drugs is given. When indicated, the stomach is emptied with a Levin tube. An in-lying bladder catheter for the more severely traumatized patients permits hourly observation of urine volume and specific gravity. These are excellent indicators of success or failure to maintain homeostasis. Provision is now

made for indicated special examinations, particularly roentgenograms. Narcotics or sedatives, if necessary, are given in small dosage by the intravenous route. The anticipation of subsequent requirements for the care of the more seriously injured patient is necessary. These include special nursing care and alerting the operating room supervisor, the anesthetist, and surgical team to the possibility of major surgery.

Subsequent care of the patient depends upon the nature and extent of the chest injury. These can be classified as follows:

1. Rib fracture,
 - a. Uncomplicated
 - b. Complicated by: (1) traumatic wet lung, (2) hemothorax, (3) subcutaneous or mediastinal emphysema and pneumothorax (figure 5), and (4) crushed chest (stove-in or flair chest) with unstable chest wall and paradoxical motion (figure 4).
2. Penetrating wounds.
3. Laceration or rupture of the diaphragm with or without injury to abdominal viscus.

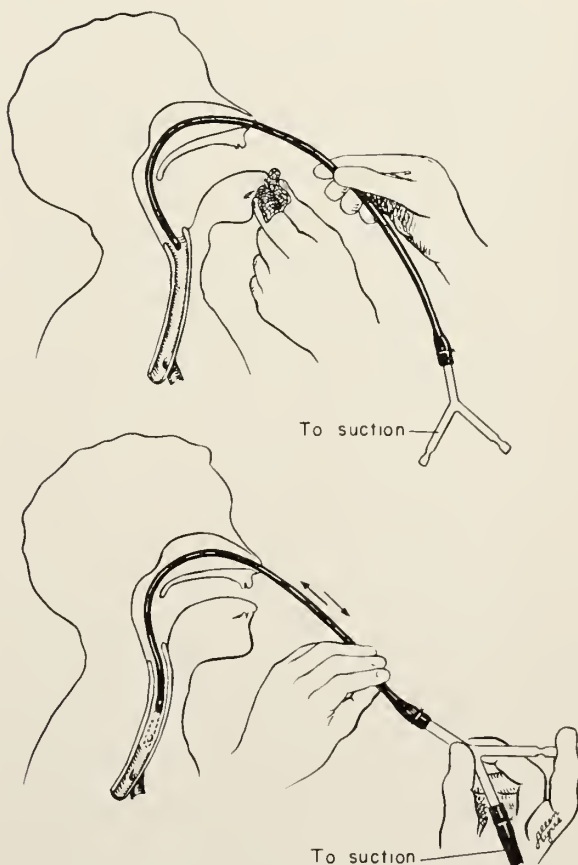


Fig. 3. Technic for blind endotracheal catheterization. Note that the Y tube permits intermittent suctioning, thus permitting more anoxia.

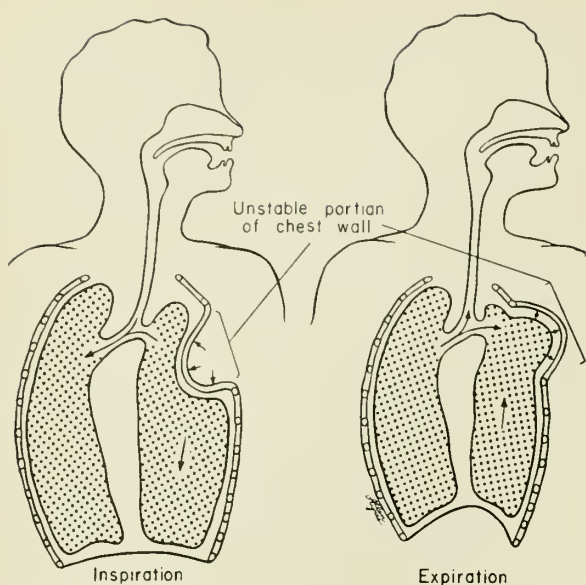


Fig. 4. Diagram showing "flail" or "paradoxical" chest wall. Arrows indicate direction of motion of chest wall and air column. Observe that the abnormal motion of the chest wall reduces ventilation of both lungs.

4. Wounds of the heart and major vascular trunks.

Rib fractures, particularly if numerous or in elderly individuals, interfere with respiration and cause accumulation of secretions, collapse of lung segments, and pneumonitis. Frequent endotracheal suctioning and intercostal nerve blocks together with antibiotic therapy and continued hospitalization are indicated until pain subsides and coughing becomes effective. Rib fractures seldom require operative treatment. If the broken rib ends are unusually jagged and directed inward toward the lung, causing continued injury to lung parenchyma, the region of the fractures may have to be exposed, the periosteum elevated, the rib cut across, and the fragments or sharp spicules removed. Brisk and continuing intrathoracic bleeding occasionally follows laceration of lung parenchyma but, more often, of a systemic vessel, such as an intercostal or internal mammary artery or vein. Surgery may then become necessary to control hemorrhage. The third reason for operative intervention in rib fracture is an extensively stove-in chest with paradoxical chest wall motion (figure 4). Wires or towel clips can be passed around ribs in such unstable portions of the chest wall, and traction applied by weights over a pulley prevents the paradoxical motion. However, at the discretion of the surgeon, it may occasionally be preferable to expose such an area through an ample thoracic incision and squarely trim the posterior ends of such fractured ribs. A drill hole is made in

the corresponding ends of all broken ribs which are then wired snugly together, thus stabilizing the chest and eliminating paradoxical motion.

During the care of chest injuries, early thoracentesis is advisable when signs of intrathoracic fluid or air become apparent by physical examination or x-ray. Should this diagnostic and therapeutic measure yield a quantity of blood or air which subsequently reaccumulates, closed catheter trocar thoracostomy and subaqueous drainage are instituted. This step prevents tension pneumothorax and leads to early recognition of continuing bleeding serious enough to require surgery. This technic facilitates the early and complete removal of blood and air, thus bringing visceral pleura to parietal pleura and obliterating dead space. The incidence of clotted hemothorax is reduced. The elimination of intrathoracic dead space also minimizes the chance of an empyema developing after penetrating wounds.

Subcutaneous emphysema may be very disconcerting—extending from the head to the scrotum—but rarely necessitating more than "tincture of time." Mediastinal emphysema, on the other hand, may lead to dysphagia and dyspnea caused by pressure on the esophagus, tra-

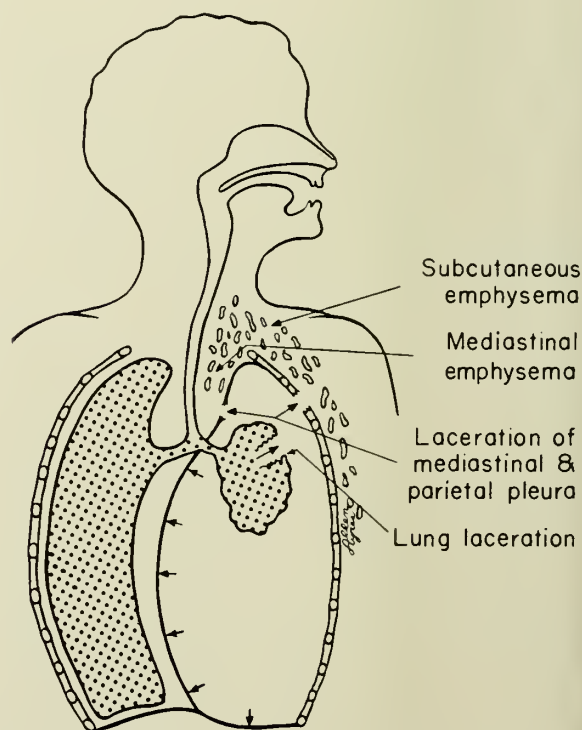


Fig. 5. Diagram showing "closed" wound (not open to atmosphere because skin is intact) pneumothorax, due to rib fractures puncturing the lung. High intrathoracic tension as well as hemothorax and mediastinal or subcutaneous emphysema may develop.

chea, and bronchi (figure 5). Decompression by cervical mediastinotomy readily solves this problem. It is well to remember that fractured ribs may cause extensive subcutaneous emphysema, but without pneumothorax. This is because the pleural space has been obliterated by an old pleurisy, which prevents collapse due to pneumothorax, thus allowing the air from the lacerated lung to escape into the chest-wall tissues or back into the mediastium. We have seen more than one case in which this probably prevented death from lung collapse and anoxia.

Contrary to the advice given by some, we feel that major intrathoracic intervention for penetrating wounds of the chest is not frequently necessary and should be limited to specific indications. Such indications are, chiefly, diaphragmatic lacerations or associated intra-abdominal injuries, continued bleeding into the chest, large lung lacerations, or rupture of a bronchus. As stated earlier, the closure of chest wounds is most often a minor procedure. Bullet wounds of the lung cause extensive contusion of parenchyma surrounding the tract, but unless a major vessel has been injured, they seldom bleed alarmingly. If the pleural dead space problem is handled skillfully and antibiotic coverage used, empyema and/or lung abscess rarely results. Conservative management usually succeeds. If large particles of clothing or foreign material are carried into the wound, these should be removed.

With regard to cardiac injuries and injuries to the major vessels, the fact must be stressed that the potential for rapidly fatal hemorrhage is so great that the patient who reaches the hospital alive will probably survive. The patient with a severe injury of this type is almost always

in a state of circulatory collapse and shock. Shock therapy should be initiated at once, which consists of an infusion of a plasma expander and then blood as soon as it can be obtained. An adequate airway must be assured and oxygen administered. Blood should be replaced as rapidly as necessary to maintain vital signs and then administered at five-minute intervals at first. The need for blood may be titrated by the response of the pulse and blood pressure. Under such circumstances, there is little danger of overloading the circulation, and it should be remembered that transfusion is as effective as any other emergency measure in supporting cardiac output in the presence of acute cardiac tamponade due to hemopericardium. Such acute compression of the heart may be recognized by rapid pulse, low blood pressure with low pulse pressure, venous distention, and distant heart sounds. Pericardicentesis is then indicated. We have found the subxiphoid route easiest. Improvement usually follows such an aspiration of an hemopericardium. A second pericardial tap should be undertaken when careful follow-up of the patient's signs indicates recurring cardiac compression. Nonlethal stab wounds of the heart usually respond to such conservative management. When cardiac compression develops a third time, it indicates continued active bleeding and open thoracotomy is indicated for suture of the cardiac wound.

SUMMARY

We have attempted to outline procedures, techniques, and rationale for care of acute thoracic injuries, indicating that the salient feature is restoration of normal cardiorespiratory physiology.

BRAN MAY CAUSE BOWEL OBSTRUCTION in persons with previous organic intestinal disease. The dried, fibrous contents of a ruptured segment of small intestine removed at operation from a 54-year-old man was found to be desiccated bran. The patient had been unable to retain food, had vomited frequently, and had had no satisfactory defecation for three days after eating about 2 cupfuls of bran for breakfast. Displacement of the intestines by dense adhesions to the peritoneum and stenosis by an adhesive band distal to the obstruction indicated that the man had had peritonitis at the time of an abdominal operation thirty-seven years previously.

A. J. CHERINI, M.D., JOHN J. FIRPO, M.D., and P. STALTERI, M.D.: *California Med.* 86:50-51, 1957.

Shock: Advances in the Interpretation of Pathologic Physiology; Emergency Treatment

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SHOCK IS AN ABNORMAL PHYSIOLOGIC STATE characterized by circulatory insufficiency caused by a disparity between the circulating blood volume and the vascular capacity.

The blood pressure is maintained by the cardiac output and by the peripheral resistance of the arteriolar bed. Fall in pressure may be caused either by a decrease in peripheral resistance after dilatation of the arterioles and capillaries or by a decrease in cardiac output following loss of blood or a trapping of the circulating volume in the peripheral vascular bed.

After an acute injury, some physiologic and metabolic changes occur as a result of damage to the cellular integrity of the tissues involved. The cell membrane normally keeps potassium and phosphorus largely within the cell, whereas sodium and chlorides are largely excluded from the cells. As a result of injury, this equilibrium is upset; potassium and phosphorus might be lost from the cell, and sodium and chloride might replace these ions. Consequently, the intracellular-extracellular content of these ions might vary from normal following injury to the tissue.

In addition, the spatially-arranged enzyme system of the cells becomes disorganized, and the orderly regeneration of the cell protein might be altered by a loss of nitrogen and further loss of potassium and phosphorus from the cell. Furthermore, the enzyme inhibitor which normally restrains cellular metabolism may be altered, and the local consumption of oxygen might increase at the expense of local, available carbohydrate reserves. All of these phenomena are commonly associated with the shock phase of the alarm reaction, as this is described by Selye, and are the result of injury to tissue per se, regardless of whatever systems might subsequently come into operation in other parts of the body.

If the stress of injury is of adequate intensity,

the local peripheral nervous system could be stimulated, and these local stimuli might be transmitted to the central nervous system where they may be interpreted and integrated into a resulting stimulus to the sympathetic nervous system to alert the body as a whole to the stress injury concerned. Peripheral sensory stimulation resulting in autonomic nervous system excitation will alarm and activate many parts of the body because of the pronounced amplification of the initial nervous impulses by the stimulation of peripheral ganglia of this system. This results in, among other things, stimulation of the chromaffin cells of the adrenal medulla to secrete epinephrine and norepinephrine through acetylcholine released by the preganglionic fibers of the sympathetic nervous system terminating in the ganglion cell in the medulla. The alarm reaction may also follow psychic stress, such as fear and rage as well as physical stress, such as trauma, infection, and hyperpyrexia. Likewise, a hypoglycemic reaction induced by insulin produces a physiologic alarm reaction with all the evidence of marked adrenocortical stimulation.

Epinephrine mobilizes liver glycogen to provide glucose as a source of ready energy for muscle and cerebrum, increases blood pressure by increasing cardiac output, but also causes some peripheral dilatation and indirectly stimulates the anterior pituitary gland to secrete ACTH, which then activates the adrenal cortex to secrete adrenal corticoids.

Norepinephrine produces vasoconstriction of the peripheral blood vessels, which results in an increase in the blood pressure, assuring a better cerebral irrigation and minimizing potential peripheral hemorrhage; but, this hormone

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does not cause the release of ACTH from the pituitary gland. In contrast to epinephrine and sympathetic nervous system stimulation, which accelerate the use of the carbohydrate reserve in the form of glycogen and result in loss of electrolytes and water in the early phases of the alarm reaction, the adrenal corticoids, produced by stimulation of the adrenal cortex by ACTH, increase the utilization of fats as a source of energy, either directly or by conversion of liver glycogen. Furthermore, through the action of the adrenal corticoids on the sweat glands and renal tubules, sodium and water are retained to replenish body fluid. Thus, the adrenal cortical hormones counterbalance the effect of the early mobilization and utilization of immediately available energy reserve in the first phase of the alarm reaction. This has been called the "adaptation phenomenon" and is largely explained by the remarkable work of Selye.

Experimentally, when an animal is repeatedly exposed to stress or injury of significant magnitude, the tissue of the body develops the ability to cope with the stress or injury more adequately than when recovering from the first stress or injury. This phenomenon is called "adaptation syndrome." Overwhelming stress, however, leads to a state of exhaustion in the experimental animal and probably in human beings exposed to overwhelming stresses like burns or trauma.

In addition to instant mobilization of pituitary ACTH secretion by the sympathetic hypothalamic pituitary system, there is a definite autoregulation of ACTH secretion. A rise in titer in circulating adrenal cortical hormones may suppress ACTH production by the pituitary gland, and, therefore, adrenal cortical activation by endogenous ACTH might become a self-limited physiologic process. Conversely, rapid utilization in cases of stress leads to more ACTH secretion. Continued sympathetic adrenal medullary exudation to continuous stress leads to prolonged, high-level ACTH secretion by hypothalamus pituitary stimulation.

Shock may be divided into 2 types: (1) neurogenic shock and (2) secondary or traumatic shock. It is to be understood that the terms primary and secondary shock are not used in respect to the time of appearance of the shock, as they are essentially 2 different physiologic conditions.

Neurogenic shock develops as a result of loss of central or peripheral nervous control of peripheral resistance. It may be caused by the nervous impulse originating from tissue damage by trauma or rough-handling during an operative procedure. This causes a dilatation of the

vascular system leading to reduction in the effective blood volume. Neurogenic shock might develop after a spinal anesthesia or after a second-stage sympathectomy as a result of interference of the vasoconstrictor nerve supply to the lower part of the body. Also, neurogenic shock might be due to transfusion reaction, removal of a pheochromocytoma, or a diseased kidney causing a hypertensive pathologic process. In such instances, shock is the result of vasodilatation because of sudden withdrawal of pressor agents like epinephrine and renal pressor agents.

The peripheral relaxation may be caused by emotion, excitation of some nerve plexuses (celiac, carotid sinus), and abnormal or abrupt alterations in position. It may also occur as a result of direct action on the vessel walls by toxic products. These toxic agents may result from a breakdown of tissue or from bacterial activity. One cannot entirely exclude the possibility that some neurogenic hypotension develops from an acute, reflex-induced primary cardiac deficiency resulting in diminished output.

Characteristics of neurogenic shock are hypotension, deterioration in quality of the pulse with little or no change in pulse rate, low pulse pressure, and pallor; although, under anesthesia, the color change may not be evident. There is no hemoconcentration or hemodilution and no blood or plasma loss.

The pulse pressure is very slight and may be so minimal that differentiation between systolic and diastolic pressures is difficult. Particularly, under inhalation anesthesia, the patient may retain a good color, and the skin may be warm and dry in the presence of hypotension of neurogenic origin. The pulse rate is usually unchanged from that existing prior to the development of hypotension.

Hypotension frequently appears abruptly and disappears abruptly. In patients in secondary or hemorrhagic shock, the pulse rate usually increases; however, exceptions to this rule are elderly patients and patients in poor condition with minimal cardiac reserve.

Secondary shock includes traumatic, surgical, and hemorrhagic shock. It is a state of circulatory deficiency in which the disparity between circulating volume and vascular capacity is occasioned by a reduction in circulating volume through plasma loss, the trapping of intravascular fluid in the peripheral vascular bed, loss of water, or loss of whole blood. Internal and external hemorrhage accounts for the reduced circulating blood volume in most cases of secondary shock. Special attention should be given to hemorrhagic duodenal ulcer, diaphragmatic

hernia, hemorrhagic esophageal varicose veins, and ectopic pregnancy. Plasma loss occurs in cases of burns, crush injuries, intestinal obstructions, bile peritonitis, and acute pancreatitis. H_2O loss and electrolyte imbalance occur in cases of severe and rapid dehydration, excessive vomiting, diarrhea, gastrointestinal and pancreatic fistula, and uncontrolled temporary or permanent ileostomy. The reduction of blood volume from loss of plasma in burn cases is due to damage to the capillaries in the burned area and adjacent tissue. In intestinal obstructions, when accompanied by local circulatory stasis, as in mesenteric thrombosis, there may be diffusion of plasma in the peritoneal cavity and in the intestinal lumen, resulting in a reduction of blood volume. The crush syndrome follows compression injuries of extremities and, when the compression is released, plasma is lost in the damaged tissue and shock develops.

There is pronounced hemoconcentration, an increase in blood viscosity, and, therefore, a decrease in cardiac output from inadequate filling of the ventricles because of diminution of venous return. Anoxia may result from circulatory failure and lead to acidosis.

The normal function of the liver is retarded when the supply of blood and oxygen is so inadequate that glycogen cannot be stored, and the deamination process is prevented. Renal impairment would lead to lower nephron nephrosis and uremia. The brain is very susceptible to anoxia, and, if shock is not relieved, there may be a period of apparent recovery and, later, the patient falls into coma or has a convulsion.

The characteristics of secondary shock are pallor, hypotension with moderate reduction in pulse quality, perspiration, cold skin, anxiety, and restlessness. The pallor and cold skin are caused by a constriction of the peripheral arterioles in an attempt to reduce the vascular capacity, which results in the circulating disparity inherent in shock. The anxiety and restlessness are due to associated tissue hypoxia.

Shock which appears in patients with toxemia is presumably caused by loss of circulating volume from the trapping of large portions of the circulating fluid and its formed elements in the hyporeactive capillary bed. Circulating fluid trapped in this area reduces the venous return, impairs the cardiac output, and lowers the arterial pressure. The hypoxia associated with the stagnant peripheral circulation perpetuates the shock.

Evidence indicates that, in the early stages of shock, a vasoexcitor material (VEM) is produced in the kidneys and muscles which pro-

vokes the arterioles into constriction in an attempt to maintain an efficient circulation. If shock progresses and hypoxia becomes severe, vasodilator material (VDM) is released into the blood stream, presumably from the liver. This substance causes vasodilation of the arterioles. In this stage, no amount of therapy will restore normal pressure and death ensues. The VEM substance is an iron-containing protein and is active when the sulfur-containing group is in the sulfhydryl form.

It is pertinent to point out that all the signs of shock must be correlated in order to evaluate the type and degree and the progress of the shock state. It is important not to overlook the patient's color, degree of perspiration, and temperature of the skin. These simple observations are a tremendous help in the diagnosis and therapy of shock.

It is also important to bear constantly in mind the patient's normal blood pressure and pulse rate. Many patients have normally low pressure and are not in shock with systolic tension as low as 80 mm. Hg. Other patients have normally high blood pressure and may be in shock with systolic pressure of 120 mm. Hg. During anesthesia, it is important to record the blood pressure and pulse at frequent intervals. Trends in the curves of pressure and pulse rate will assist materially in the early recognition of shock and the detection of improvement after therapy.

One of the most exasperating circumstances occurs when a hypotensive state has developed which, from the available history and signs, appears to be secondary shock. Following appropriate intravenous administration of fluid, there is a response in the blood pressure which is limited and below the patient's original level. When there is no improvement after fluids have been replaced in amounts which, with conservative estimates, seem to be greater than the loss, one is then confronted with the problem of determining whether there is an element of neurogenic shock, an incorrect estimate of the loss of blood, or cardiac decompensation. One is reluctant, particularly when treating the elderly patient with a borderline cardiac reserve, to continue fluid replacement and is, at the same time, unwilling to permit the residual hypotension to persist without therapy. In this situation, additional information can be secured by using methods for determining plasma volume.

There are compensatory changes consisting of vasoconstriction and hemodilution. Vasoconstriction reduces the size of the vascular bed by selective vasoconstriction in the skin and kidney. It has been estimated that about 500 cc. of blood

normally contained in the vessels of the skin is thereby made available to vital organs, such as the brain. However, vasoconstriction of the renal vessels might have a damaging effect. Hemodilution restores the reduced blood volume by passage of H_2O and electrolytes from tissue spaces in the blood stream. Hemodilution cannot occur in dehydration or severe anemia. It is obvious that vasoconstriction and hemodilution cannot be relied upon to maintain an adequate blood volume in patients in whom hemorrhage has been severe and prolonged.

TREATMENT

Prophylaxis. Careful handling of organs during the operation, the administration of oxygen, and frequent blood-pressure readings are essential points.

Neurogenic shock is treated specifically by overcoming the relaxation of the peripheral vessels. This can be accomplished best by removing the cause. If the cause is manipulation around a nerve plexus, the manipulation should be discontinued or, if it is not possible to avoid the manipulation, procaine can be injected directly into the plexus to block the reflex. Abnormal positions can be alleviated and abrupt changes in position avoided.

If the cause cannot be determined or removed, vasopressor drugs must be employed to combat the peripheral relaxation of arterioles and capillaries. Mephentermine sulfate (Wyamine), ephedrine, Neo-Synephrine, desoxyephedrine and methoxamine or norepinephrine solution should be used. Epinephrine is contraindicated because of the secondary relaxation that accompanies its use.

The vasopressor drugs should not be injected subcutaneously or intramuscularly if hypotension is severe, because absorption will not take place and a response will not be obtained. Furthermore, if and when a normal tension is restored, the drug injected subcutaneously and intramuscularly during the hypotension will then be absorbed and abnormally high pressure will result.

It is a good policy in neurogenic shock to administer oxygen and lower the patient's head until specific measures have restored normal tension. Oxygen helps to reduce the hypoxia, and lowering the head promotes venous return. The head should not be lowered more than 10 to 15 degrees. In mild shock, these two simple measures suffice to restore the blood pressure.

The amount of hemorrhage necessary to produce shock varies with the individual and the sex, since men are more susceptible than women. It is usually necessary for the patient to lose 25

to 40 per cent of the total blood volume, or 1,500 cc. to 2,000 cc. of the total circulating blood, to produce a state of shock. Cold, exposure, and severe pain aggravate shock. Anoxemia and increasing capillary permeability lead to loss of plasma and hemoconcentration. Loss of blood in the soft tissues and the gastrointestinal tract is difficult to evaluate. A patient losing less than 350 cc. of blood in the gastrointestinal tract may not show symptoms of shock. Once shock has developed, the only reliable guide is the blood pressure. Nevertheless, in patients with hypertensive vascular disease, the blood pressure might not fall below the average normal range. In such eventuality, the patient might present a systolic pressure of 120 mm. of mercury and still be in shock.

The hemoglobin and hematocrit determinations do not reflect the changes in blood volume. The decrease in blood volume, and particularly the oxygen-carrying capacity of the blood, must be restored by transfusion of whole blood before major operative procedures are performed on such patients. Usually 500 cc. or 1,000 cc. of blood should be given, depending on the degree of anemia, prior to the day of operation.

In hemorrhagic shock, there is no substitute for whole blood. Plasma administration, if it restores blood volume, does not restore the oxygen-carrying capacity. The result is estimated not by the amount of blood lost, which is always underestimated, or the amount of blood administered but by the patient's response to the transfusion as indicated by the level of the arterial blood pressure. Intraarterial transfusion has the advantage of rapidly filling the renal and coronary arteries, as well as the cerebral vessels, simultaneously with restoration of blood volume. In some cases of peritonitis or intestinal obstruction, plasma or whole blood transfusion might not be effective, presumably because of the irreversible dilatation of the small vessels due to toxic products of infection.

Plasma expanders are effective in burn shock; however, blood should be given if more than 1,500 cc. of expander is given. In hemorrhagic shock, no more than 1,000 cc. of an expander should be given without addition of whole blood.

Of particular interest are several cases of shock and death due to afibrinogenemia; the deaths are brought about by the calamitous dissolution of the blood coagulation mechanism. An appreciable number of deaths from afibrinogenemia occur in congenital or acquired chronic afibrinogenemia due to basic disturbance of the protein metabolism manifested by its profound effect on the blood clotting process, premature separation

of the placenta, or extensive surgical procedures, such as pancreatic and thoracic surgery. Greatly reduced fibrinogen levels were observed in pernicious anemia, when bone marrow was destroyed as a result of metastasis from prostatic carcinoma, and in cases of erythremia and myelogenous leukemia.

Fibrinogen should be administered when the blood level is below 100 mg. per cent. In afibrinogenemia associated with premature separation of placenta, 2 to 6 gm. of fibrinogen should be administered intravenously, depending upon the response of the patient. In other afibrinogenemic conditions, the dosage of fibrinogen should be adjusted to the clinical response of the patient and the plasma fibrinogen level. It is important to mention that Parenogen (commercial preparation of fibrinogen) has been subjected to ultraviolet radiation. This method of sterilization cannot be relied upon to completely inactivate all viruses, including homologous serum jaundice virus, if such contamination is present in the original plasma. In using Parenogen, the danger of transmitting the virus to the patient should be considered very carefully and balanced against the danger of hemorrhagic complications.

The intravenous administration of norepinephrine (Arterenol) is certainly a great advance in shock treatment, although it is not the answer to the categoric shock treatment. Most patients respond promptly. Others require continued, persevering treatment several days or weeks. Norepinephrine solution has been administered intravenously in doses as high as 32 mg. in concentrated solution without detrimental effect to the patient. Some patients have been kept as long as ten to fourteen days on antishock treatment with intravenous administration of norepinephrine. Nevertheless, several refractory

cases have been reported. It seems that the underlying pathologic process might be due to mechanical interference with venous return to heart, such as pulmonary embolus; or to an inadequate blood volume caused by unrecognized continuous internal hemorrhage; or, in some cases, the result of coronary thrombosis or myocarditis. It is obvious that in case of failure of the heart itself, pulmonary embolism, or pericardial tamponade, transfusion is contraindicated or will be ineffective or might throw the patient into pulmonary edema.

ACTH plays a role in maintenance of normal vasomotor tonus. The use of ACTH and cortisone depends upon whether the adrenal cortical failure is secondary to disease of the pituitary glands or primarily adrenal in origin.

In cases of burns, there is an adrenal hyperactivity mediated through the pituitary gland, with an increase of adrenal hormone as revealed by eosinopenia and the urinary output of ketosteroids.

The hydrocortisone solution should never be mixed with a norepinephrine solution. For better control of shock, it is preferable to administer each drug in a separate vein. Several cases of overtreatment of shock by cortisone have been reported. This produces an electrolytic imbalance with hypokalemia, hyponatremia, and alkalosis. Loss of potassium from cells appears to initiate an alkalosis which is partly compensated by loss of chlorine and retention of carbon dioxide. Large amounts of potassium reverse this pathologic process, especially if it is given with testosterone propionate, which enhances the fixation of potassium to the cells; and its effect is more permanent than that of large doses of potassium in reversing the hyponatremic hypokalemic alkalosis.

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Pyometra: Significance and Management

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THE ACCUMULATION OF PUS in the uterus may be a serious gynecologic problem. Fortunately, however, it has been considered a rather rare complication, and, in some cases, it may be preventable.

In general, pyometra is caused by a cicatrix or a neoplasm blocking the cervix and the concomitant growth of pathogenic bacteria behind the obstruction. The necessary factors for bacterial growth; namely, darkness, moisture, warmth, and nutrition must be present. The obstructed cervix in the presence of bacteria and blood permits the uterus to become an excellent culture medium.

During the period in medical history when foci of infection were eagerly sought as causative factors, a case of pyometra of the cervical stump was reported in 1934¹ as explaining the source of infection in an arthritic knee joint.

In aspirating the knee joint of a female patient, 35 cc. of a turbid, greenish-yellow fluid was obtained which contained considerable fibrin. Culture of the fluid was negative. A diagnosis of infectious arthritis was made. About seven years previously, Drs. C. H. Mayo and C. F. Dixon,¹ in a report in the literature, recommended the removal of residual cervixes in cases in which abdominal pain or chronic arthritis persisted after supracervical hysterectomy. In view of this suggestion, the patient was re-examined and, because of the presence of a cervical stump, a diagnosis of a chronic cystic cervicitis with a possible pyometra was made. A laparotomy was performed, and a pus pocket was discovered in the cervix which held between 5 to 10 cc. of a yellow, odorless, fluid pus. The author, in reporting this case, stated that the comparatively large collection of pus in the upper end of the cervical stump, discovered several years after a supracervical hysterectomy, would not have been found or suspected without the knee symptoms and that smaller collections of pus would have been completely missed had they been present.

In retrospect, we might ask whether this was a true pyometra or a coalescence of several large nabothian follicle cysts. Foci of infection as causative factors in disease processes no longer receive the attention they did even twenty-five years ago. In addition, the tendency toward total hysterectomy, when a uterus requires extirpation, obviates the presence of a cervical stump as a possible source for such foci.

In 1951, Carter and his group² pointed out that pyometra is much more common than a review of the literature indicated. They stated that this can be verified in any large clinic by the routine practice of sounding all endocervical canals in every gynecologic examination. The incidence of pyometra will increase by the installation of any controlled plan to insure the patency of every endocervical canal under study, and it is particularly important to realize that every patient with a history of a cervical operation of any kind or with a history of cervical radiation for a malignant neoplasm is a potential candidate for pyometra. This becomes increasingly certain in some cases if pathogenic bacteria are accidentally introduced into the vagina as a result of poor perineal hygiene.

Carter and associates studied 133 patients with pyometra and found malignant neoplasms in 95 and nonmalignant conditions in 38. Of the latter, 29 were postmenopausal patients in whom stenosis of the cervix was present but was not attributable to operative procedures. Only 4 of these patients had stenosis caused by a previous cauterization; 2 cases of pyometra were the result of endometrial tuberculosis, while 2 other cases were found in cervical stumps.

Cultures of the pus obtained from each of the 133 patients were negative in 21; in 49, anaerobic bacteria were reported; in 12, aerobic bacteria were found; while the largest number, 51, showed a mixture of aerobic and anaerobic bacteria. From these figures, Carter emphasized the importance of the endogenous ascending type of infection in the more common forms of

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pyometra, since, of the 112 cultures, 100 showed anaerobic bacteria, and in 49 per cent of these, there were no associated aerobes.

In 1952, Henriksen³ reported on 118 cases of pyometra, 73 of which were found at autopsy, while 45 were either suspected or proved by office or hospital examinations. In reviewing these cases, pyometra was considered to be the primary cause in 20 deaths. Repeated or improper cauterizations of the cervix were responsible for 16 cases; 12 cases followed childbirth infections or inflammatory lesions; 5 cases were associated with senile vaginitis; there was senile atrophy of the genital tract in 31 cases; pyometra after cervical amputation or repair was found in 6 patients; there were 5 cases which followed radiation therapy for benign cervical or uterine pathology; 9 patients had benign lesions of the endocervical canal; there were 4 cases of tuberculosis of the cervix; 1 patient had an adenocarcinoma of the endometrium; 14 patients had pyometra present in cervical stumps; and in 9 patients, there was a history of attempted criminal abortion. As a result of this study, Henriksen pointed out that the diagnosis of pyometra can be confirmed by dilatation of the cervix. Treatment is dependent upon the extent of the pyometra. If the occlusion of the cervix is complete, adequate primary dilatation and the establishment of good drainage is usually sufficient. Occasionally, repeated dilatation may be necessary, and antibiotic therapy may often be of value. The possibility of an associated uterine lesion must always be considered. Uterine curettage is only indicated with primary dilatation, when the pyometra is relatively small and the corpus is firm and without evidence of cellulitis. If cellulitis is present, curettage must be deferred until drainage is complete in order to avoid perforation.

Hysterectomy is rarely indicated and only if there is failure to maintain satisfactory drainage, if there is associated uterine or adnexal pathology, or if possible irreparable damage has resulted from the pyometra.

Henriksen³ believes that most cases of pyometra can be prevented by being alert to the established principles of good medical and surgical care. The number of cases of pyometra will be materially reduced if a complete history is taken, particularly in regard to an operative procedure of any kind on the cervix; if an adequate visual and bimanual pelvic examination is made; if cauterization and conization are done to avoid possible cicatrization and with subsequent determination of endocervical canal patency; if the postoperative and postnatal cervix is adequately

cared for; and, finally, if a check for cervical patency becomes routine. Henriksen concludes his excellent paper with the statement, "Regardless of type, pyometra is potentially dangerous and should be considered an important surgical problem until its true status is determined."

Curtis,⁴ in discussing the causes of pyometra, states that it occurs frequently when the cervical canal becomes blocked with a neoplasm. Infection is invariably present in these cases because of secondary bacterial invasion. Varying degrees of endocervicitis and myometritis often develop with a complete loss of the endometrial lining. The pyometra may, in rare cases, amount to several hundred cubic centimeters of pus. Increased pressure of the confined fluid eventually leads to a persistent, more or less offensive discharge.

Pyometra, then, may be the first evidence of endocervical carcinoma. Although cervical stricture is the most common cause of pyometra, carcinoma originating within the cervix accounts for many such cases. Pyometra also occurs in carcinoma of the body of the uterus when there is an associated cervical obstruction, but it is much less frequent than in cases of carcinoma of the cervix. Attention should be focused on any senile uterus which has been converted into an enlarged fluctuant mass. Such cases should be suspected of harboring a malignancy until proved otherwise. Every patient who has had an endocervical conization or cauterization should be observed at frequent intervals until complete healing takes place, in order to prevent subsequent cervical stricture. The two most common symptoms of postmenopausal cervical stenosis are pyometra and senile vaginitis due to interference with uterine drainage. There is retention with infection of the uterine contents. As the pressure of the retained pus becomes sufficient to overcome the stenosis, emptying of the uterine contents into the vagina is incomplete with consequent irritation of the vaginal mucosa, which produces vaginitis. In all cases of sudden onset of a profuse, irritating postmenopausal leukorrhea, cervical stenosis and pyometra must be ruled out.

In conclusion, TeLinde⁵ outlines certain general principles which should be reiterated:

1. Where cervical operations are necessary, care should be exercised in maintaining patency of the endocervical canal.

2. If choice of an operative procedure is to be based on the avoidance of complications, it should be remembered that conization is more apt to result in stricture than cauterization, circular amputation of the cervix, or the insertion of radium.

3. After the menopause, pyometra often results from some form of partial or total cervical occlusion, although it is possible to see complete cervical occlusion in elderly women with a prolapse, who never have had symptoms referable to the obstruction. This, of course, merely indicates that stenosis is present but the associated infection is absent.

4. Cervical stenosis is treated by dilatation. However, when pyometra is present, instrumentation should be kept to a minimum and should be only that amount necessary to secure adequate drainage. Ordinarily, curettage should not be done at the time of drainage, but should be delayed for at least one month after drainage has been established.

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THE RISK OF RESIDUAL HYPERTENSION is not increased by prolongation of a toxemic pregnancy to improve fetal prognosis. Among 434 women who had had preeclamptic toxemia during late pregnancy, examination about four years later did not show either duration or severity of toxemia to be correlated with later hypertension. Prognosis was related to age of the patient, with chronic blood pressure elevation being more frequent among older patients. Residual hypertension, or pressures above 140/90, was observed in 30.2 per cent of the total group.

GEORGE B. GIBSON, M.B., Queen's University, Belfast, Ireland. *J. Obst. & Gynaec. Brit. Emp.* 63:833-840, 1956.

MULTIPLE PRIMARY NEOPLASMS probably develop in approximately 1 of every 30 women who have gynecologic cancer. Both tumors may affect the genital tract; otherwise, the nongenital tumor usually occurs in the breast but may arise in the colon, stomach, bladder, or other organ.

Diagnosis of multiple primary cancer is based on the following criteria: (1) the macroscopic and microscopic appearances of the tumors must be typical for the organs involved; and (2) exclusion of metastases must be certain.

Five- and ten-year survival rates with cancer of the cervix, corpus, and ovary are appreciably higher in patients with multiple tumors than in unselected patients with malignant gynecologic disease. The difference is most pronounced when the gynecologic tumor is the first of the multiple cancers to be recognized. Perhaps, individuals with multiple primary tumors have slower growing neoplasms or greater resistance to tumor spread.

Since multiple tumors are not uncommon, all cancer patients should be examined yearly even if the initial tumor is completely arrested. New symptoms or signs in these patients require thorough investigation, because a second primary tumor may often be successfully treated.

L. B. BROWN, M.D., J. P. A. LATOUR, M.D., and J. R. DODDS, M.D., Royal Victoria Hospital and McGill University, Montreal. *Am. J. Obst. & Gynec.* 73:127-133, 1957.

Integration of Psychiatry Into General Medicine: A Practical Solution

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THE AUTHORS feel that a great need in medicine is complete integration of psychiatry, without discrimination, into general medicine. Dr. Elmer Hess, while president of the A.M.A. in 1955, said, "I think that mental health becomes automatically a concern for all practicing physicians, not just psychiatrists. Physicians should take an increasingly active part in the development of more psychiatric units in general hospitals."

THE NATIONAL MENTAL HEALTH COMMITTEE reported in March 1956 that 10,000,000 people in the United States are suffering from some form of mental illness. There are approximately 700,000 patients in the various state hospitals at a given time. This leaves the vast majority of psychiatric patients without hospitalization. They seek private medical care in such numbers that 50 per cent of general practitioners' patients are said to suffer from mental illness.

If this vast disturbed population is to receive proper attention, the private medical and private psychiatric practitioners must bear the responsibility. Unfortunately, perhaps the greatest number of psychiatrists are in institutional practice; one-fourth are administrators, superintendents, or commissioners. Fewer than 4,000 psychiatrists are in private practice in the United States.

The lack of private psychiatric care has been frequently overlooked because of the pressing need for psychiatrists by the state hospitals. Not a single psychiatrist was engaged in private practice in North Dakota before June 1954. Wyoming had 1 and South Dakota had 2 psychiatrists not connected with the state or a veterans hospital.

Patients with mild emotional disorders from these rural areas have been forced to go out of their state for therapy. This has been, frequently, an economic blow that only increased their distress. The other choice was admission to the state hospitals and this, in some cases, becomes an added emotional burden.

AN ATTEMPTED SOLUTION

The foregoing situation is disturbing, for we believe that at least 4, and perhaps 6, cities in

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North Dakota deserve and can support neuro-psychiatry. It has been estimated that a psychiatrist requires approximately 50,000 people to support an active and efficient practice. The large rural population in North Dakota and several neighboring states makes several areas quite capable of supporting this type of service even though the cities are not large. Also, this request for 3 to 5 psychiatrists does not appear to be unrealistic for this state.

The St. Michael's Hospital in Grand Forks, North Dakota, is a 200-bed institution where 18 beds are set aside for the treatment of emotionally disturbed or neurologic patients or, frequently, both. The nurse in charge is a sister chosen because of her interest in psychiatry and her success in handling these patients. One charge nurse has been able to handle the ward during the night and, during the day when activities are more demanding, 2 more nurses and 3 nurses aides are on duty. In a two-year period, it has not been necessary to add male attendants to handle the more disturbed patients. In most cases, the hospital budget would not permit this and such patients are referred, when absolutely necessary, to larger facilities. Only about 5 per cent needed such transfer.

No particular changes in the physical arrangement appear necessary in many of the ambulatory sections. In St. Michael's Hospital, matched locks were simple to obtain for all the psychiatric area; escape proof screens were purchased; and doors to individual rooms were divided so that barricading was not possible from the inside.

The largest room in the ambulatory wing has been reserved as a day room. It contains magazines, newspapers, card tables, radio, and a television set. Patients are encouraged to spend as much time as possible socializing, and there are no restrictions on remaining in one's own room. At meal time, the day room becomes a dining room and the trays are served individually, according to menus chosen by each patient from the printed menu card.

An occupational therapy room is referred to as a "hobby room." This is located on the hos-

pital's main floor and is completely but inexpensively equipped for all types of handcraft, painting, metal work, weaving, and leather craft. The patients enjoy leaving the ward, and, on most occasions, they spend a few moments on the way at the magazine counter in the main lobby.

Personnel requirements for 18-bed units include: (a) neuropsychiatrist, (b) clinical psychologist, (c) internist for consultation, (d) head nurse with psychiatric training, (e) 4 registered nurses, (f) 4 nurses aides, (g) part-time occupational therapist, (h) part-time social worker, and (i) chaplain available for each religious group.

Staff conferences are needed daily during the first few months as the ward procedures are formulated. Thereafter, weekly conferences are a minimum requirement. After six months, the ward routine can be smooth enough to become a therapeutic tool.

EXPERIENCE WITH ACTIVE TREATMENT

Each patient is seen during the morning hours by the attending psychiatrist and the referring physician when available. These hospital rounds are all accomplished before patients leave the ward for any activity. In the afternoon, each for whom psychotherapy is feasible is seen by the psychiatrist or clinical psychologist for testing or individual psychotherapy. These interview periods are regarded as the most valuable time of the day. Patients come to consider medication, electric-shock, and insulin treatment as devices for increasing the value of psychotherapy and promoting its efficacy.

ELECTROSHOCK THERAPY

Electroshock therapy and insulin therapy are referred to by ward personnel as "sleep treatments." "Sleep treatment" is a term chosen not for its euphuism alone but because "sleep" is the only part of the E.S.T. procedure of which patients are aware. Treatments are given Monday, Wednesday, and Friday during the usual breakfast period. Those receiving convulsive treatment are sedated at 7 A.M. with 3 gr. of Sodium Amytal and an atropine-like drug to prevent excessive salivation. At 8:30 A.M. each is given enough intravenous Sodium Amytal to make him lethargic but not asleep. Patients are lifted by 4 nurses to a cart for transfer to the treatment room. The same nurses lift the patient to the treatment table, hold him gently during the treatment, and return him to his own bed a few minutes later.

As the more severely depressed patients do

not appear to profit from medication, our experience has demonstrated that a combination of psychotherapy and electroconvulsive treatment is still the method of choice in depressions. Among our 500 admissions during the first two years, we have found only a small proportion who need electric treatment. The E.S.T. records now total 800, most of them concentrated in the year before we found that tranquilizers were effective.

Evaluation of each patient before electroconvulsive treatment includes: (1) psychiatric and psychologic diagnoses, (2) medical and neurological examinations, (3) specialist consultations, where indicated, (4) urinalysis, red and white blood cell counts, and a differential count, (5) serology, (6) x-ray studies of chest, skull, and spine, (7) electrocardiogram, and (8) electroencephalogram, if clinically indicated.

INSULIN TREATMENT

Insulin therapy lasts four hours each week-day morning. Deep insulin coma therapy is not attempted at the present time, but considerable help has been obtained with lesser degrees of hypoglycemia.

Anxious, tense, often tremulous patients who eat and sleep with difficulty are most often improved by small doses of insulin with psychotherapy. Alcoholics frequently respond well to this regimen, after their fluid and electrolyte balance has been achieved. We start with 10 units of regular insulin the first day and increase by 10 units daily to 50 to 60 units. The efforts of Alcoholics Anonymous have been employed regularly and with success. The structure of Alcoholics Anonymous differs from the 2 large abstinence societies of Europe, the "Blue Cross" and the "Order of the Guttempler." Both Bleuler and Kraepelin realized the importance of the group spirit and expected every patient they treated to join the organizations. This has been our local attitude in regard to AA.

TRANQUILIZERS AND SEDATIVES

Tranquilizing agents are further devices that have helped make private psychiatric care more practical. Our service has used no barbiturates for sedation except as pretreatment medication for E.S.T. Our most frequent sedation order is 10 gr. of chloral hydrate every four to six hours during the day and 15 gr. at bedtime.

Our outline of patients' medication and dosage are approximately as follows:

1. Disturbed psychotic patients may receive 50 to 100 mg. of chlorpromazine (Thorazine) intramuscularly unless they are under the influ-

ence of alcohol or other drugs. We change to oral medication as soon as possible.

2. Agitated patients, with or without depression, are frequently given a trial of 25 to 75 mg. chlorpromazine orally four times daily.

3. Mildly disturbed patients receive 25 mg. of chlorpromazine four times daily or 0.25 mg. of reserpine (Serpasil) four times daily, and evaluation proceeds.

4. Tense, anxious patients are usually given 200 to 400 mg. of meprobamate four times a day with, occasionally, 10 to 15 gr. of chloral hydrate in addition.

5. Patients not responding well to the aforementioned medications have occasionally been treated with promazine (Sparine), hydroxyzine (Atarax), or prochlorperazine (Compazine) with results we are beginning to classify.

6. Mildly depressed patients have frequently responded well to 10 or 20 mg. of methyl-phenidylacetate hydrochloric acid (Ritalin) at 8 A.M. and 2 P.M. Our greatest success with this substance has been, however, with narcolepsy and the drowsiness that may occur in patients receiving chlorpromazine or reserpine. Alpha-(2-piperidyl) benzhydrol hydrochloride (Meratran) has been of value in mildly depressed patients who have no severe agitation, anxiety, or obsessive symptoms.

7. We are at present evaluating a new substance especially of value in ambulatory patients.

It is to be noted that most of the patients previously discussed can be treated in a general hospital. The basic treatment required is *psychotherapy*, time consuming though it may be. Other therapies that were discussed are designed to make psychotherapy shorter, more effective, or more practical.

The wisdom of permitting a patient to recover from distress without huge hospital and travel expense is quite obvious. The value of convenient postdischarge interviews is of such importance that they alone justify local treatment. Few patients have failed to return for psychotherapy for as long as it appears necessary.

CONCLUSIONS

In our experience, psychiatric therapy in a small city has proved practical and efficient. There is a special sphere of influence for general hospital psychiatry that does not overlap the function of a state hospital. Actually, if properly conceived, it is a most valuable adjunct to state hospital care which must remain the backbone of a rural treatment program because:

1. Many psychiatric illnesses are prolonged and expensive, so that patients often need state help.

2. Centers for study and research are growing more important as the knowledge of psychiatry advances, and such studies are frequently best carried out in large state institutions.

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THE INCIDENCE OF SEIZURES varies with the phase of the menstrual cycle in some female epileptic patients. Convulsions occur most frequently immediately before, during, and after menstruation and least often during the luteal stage, four to thirteen days before menstruation begins.

Relationship between seizures and menstruation was determined for 50 patients. In 28 per cent, no correlation was evident; in the remaining 72 per cent, significant catamenial influence was noted. The midluteal reduction in seizures, but not the menstrual increase, was especially pronounced when only regular menstrual periods were considered.

Possibly, progesterone secreted during the luteal phase protects the patient against fits, and increase in frequency of seizures during menstruation is attributable to withdrawal of this protective agent. Tests with experimental animals indicate that progesterone does exert some anticonvulsant effect.

JOHN LAIDLAW, M.D., Postgraduate Medical School of London. *Lancet* 271:1235-1237, 1956.

Balanced Amphetamine and Sedative Combination in the Treatment of Obesity

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RECENTLY, combinations of sedatives and amphetamine have been used in the treatment of obesity. The underlying idea is to depress appetite and hunger and, at the same time, diminish the excitability and sleeplessness caused by amphetamine by the addition of a suitable sedative. To the best of our knowledge, a relationship between the effects of d-amphetamine and the dosage of sedative has not been reported. In our studies of obese patients, we were impressed by the observation that such a definite relationship exists and that the degree of weight reduction with a given dose of d-amphetamine is dependent upon the dose of added sedative.

In our clinical investigation, 3 different preparations were used, A, B, and C, that varied only in the amounts of added barbiturate. The basic composition is as follows:

BASIC FORMULA

d-amphetamine sulfate	5 mg.
barbiturate, see text	
methylcellulose	200 mg.
magnesium trisilicate	200 mg.
thiamine hydrochloride	0.67 mg.
riboflavin	0.67 mg.
nicotinamide	6.7 mg.

Formula A contained 32 mg. of amobarbital; C contained 16 mg. of phenobarbital and 16 mg. of secobarbital; and B contained 16 mg. of amobarbital.

Methylcellulose was added to act as bulk in order to give a feeling of satiety and to counteract constipation. Magnesium trisilicate was given for the latter purpose and for neutralization of gastric acidity, which might diminish hunger. The 3 vitamins were added because they play a role in fat metabolism and, thus, may contribute to better metabolic functions. One capsule of each preparation was taken thirty minutes before each of the 3 main meals, and no special

diet was prescribed. Each subject was seen regularly, weight was recorded, and blood pressure and pulse were checked.

PROCEDURE

Our series consisted of patients referred by their physicians or volunteers from among the personnel. Their overweight, as far as could be determined, was caused by lack of physical activity and overeating; the latter was sometimes related to psychologic problems. A medical history was taken, including an attempt to evaluate the psychologic background, and bodyweight, blood pressure, and pulse rate were determined. The ages of the patients varied between 25 and 64 years, with an average of 40 years. Ideal weight was calculated from the Metropolitan Life Insurance tables; actual weights of the subjects varied between +12 and +77 per cent of the ideal weights, with an average of +35 per cent. Most of the patients had tried diets and drugs, such as amphetamine, thyroid, and various patent medicines, but all of them were or had become ineffective or had produced undesirable reactions.

RESULTS

A total of 26 subjects were followed. Each of them received 1, 2, or all 3 of the formulas in succession for twelve to thirty-six days. The results are presented in table 1, arranged according to the length of time the medication was administered. Since results were similar with capsules A and C, they were pooled and compared with those obtained with capsule B. Administration of capsule B produced a distinct average loss of weight, while capsules A and C produced rather negligible changes.

DISCUSSION AND CONCLUSION

It is evident, even without statistical analysis, that the difference between the results of preparations A and C, as compared to B, was significant. The explanation for this is evidently the

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TABLE 1
CHANGES IN WEIGHT ($\pm$ KG.) IN OBESE SUBJECTS WITH
PREPARATIONS CONTAINING 32 MG. OF BARBITURATE
A OR C OR 16 MG. OF BARBITURATE B

Days		A or C	B
12 to 16		0	-3.5
		-1.7	-2.8
		+1.3	-4.2
		+0.4	0
		+0.5	+1.2
		0	+0.3
17 to 22			+0.5
	Averages	+0.14	-1.5
		0	-2.0
		0	-9.5
		+0.3	-1.6
		+0.8	-0.9
24 to 36		0	+0.8
		-0.5	-0.2
		+0.1	
	Averages	+0.1	-2.2
		0	-3.8
		0	-1.5
			-1.4
		-1.6	-5.3
		-1.0	0
			-1.0
			-1.3
	Averages	-0.65	-1.7

difference in barbiturate contents of A and C, each of which contained 32 mg., and B, which contained only 16 mg. Apparently, the larger dose outweighed the stimulating effect of the d-amphetamine, while the smaller dose was better balanced and did not counteract the tend-

ency to lose weight, which the d-amphetamine produced. It is difficult to explain this action in terms of pharmacology. We have noticed in previous work that amphetamine, beside depressing appetite and hunger, increased activity, made the patient more alert, more inclined to follow a diet, and refrain from overeating.¹⁻³ It is possible that a larger dose of barbiturate would abolish this type of effect. It is possible, also, that the higher dose of barbiturate would annul the central effects of d-amphetamine on hunger and appetite as described by Harris and associates⁴ and Sangster and associates.⁵ Apparently, the effects of d-amphetamine on weight loss must be explained by a number of different mechanisms. First, gastric hunger motility is considerably depressed, which, according to our own work, is adequate to explain the loss of desire to eat.¹⁻³ Second, there is a central depression of hunger.^{4,5} Third, there is increased physical activity, and, fourth, there is an increased alertness, which enables the patient to discipline himself better, follow the diet, and abstain from overeating. A relatively large dose of sedative may interfere with all these effects.

SUMMARY

In a study on weight reduction using a preparation containing d-amphetamine, a higher dose of added barbiturate was found to reduce the anorectic effect.

The preparation used in this study was supplied by Smith-Dorsey Co., Inc., under the name of Nexorin (formula B).

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CALCIUM GLUTAMATE reduces bronchial secretions of asthma in volume and viscosity. The vital capacity usually increases by about 20 per cent during treatment, and exercise tolerance improves. No toxic effects were observed when the drug was given in doses of about 3 gm. daily for as long as two years. Because the potassium content of the secretions decreases during treatment, the beneficial effects are believed to be partially attributable to decreased cellular potassium loss. The efficacy of the medicament is often enhanced by concurrent potassium chloride administration.

I. S. EPSTEIN, M.D., and M. G. SEVAG, Ph.D., University of Pennsylvania. Ann. Allergy 14: 469-479, 1956.

The Recalcitrant Patient

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THE RECALCITRANT PERSON is resistant, stubborn, obstinate, disobedient, even insubordinate, nay defiant, and does not do what he is supposed to, ought to, or is told to do. He may be a noxious influence, a disturbing element in an otherwise orderly and compliant population. The recalcitrant has emerged as a cause for concern, not because he is a recent phenomenon, but because we are now forced to acknowledge our responsibility toward him.

Recalcitrance is a barrier; it separates us from our patient. He becomes a defeat for us as well as himself. The factors portrayed affect both sides in varying degrees and modify the responses of each toward each other. Therefore, the major step in developing rapport and thereby solving both the patient's problem and the health counselor's responsibility is a mutual understanding of their mutual dependence.

Let us examine this person with tuberculosis who does not follow orders. Not just who is he, but rather why is he? The lack of ability to understand is an obvious possible reason—the bobbing head that signifies acquiescence, unquestioning and uncomprehending. Yet, many intelligent individuals do not completely understand the admonitions and instructions of the doctor, nurse, or social worker. What is so clear in the mind of the health counselor may be received as a distorted or incomplete concept.¹ Can it be that we are poor communicants rather than he a poor recipient?

Removal from work, home, and society for months; financial stress; and fear of death from the white plague modify the attitudes of even those persons who know and understand what must be done, what is best for themselves and their families. What impact must this disease have upon the unstable or troubled? In addition, it is mandatory that the individual with tuberculosis acknowledge to himself that he has the disease—a situation that just could never happen.

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This aspect was evident in a recent study of the attitudes of people toward the chest x-ray.²

There also are the difficult individuals who require understanding, sympathy, and effort, such as the alcoholics, the lonesome elderly, the prepsychotics, the wanderers, and those for whom tuberculosis is a useful crutch. There are those whose mores, religion, or "health guidance" precludes understanding. And, there are the persons we just do not like. How far can any patient stray from the ordered regime before he becomes recalcitrant? Is not the quantity as well as quality of our patience modified by our attitude toward him? And yet, the number of recalcitrant patients is remarkably small considering what tuberculosis does to the noninfected remainder of the host and his family.

The total of recalcitrant health workers, however, is not so small. Shirk, reluctance, repugnance, and unyielding are other synonyms that come to mind. All public health personnel, official and voluntary, do not utilize the recent developments, not to mention long-available tools for the control of tuberculosis. A home-care program that avails itself of community resources eliminates the sanatorium waiting list^{3,4} and restores the family unit in months instead of years. Case finding that probes into the jailed, transient, and elderly populations shows surprising results.⁵

Critical self-evaluation can point out serious deficiencies in community control and patient care by both public health and the private physician, thus realigning perspective.⁶

Some health departments and sanatoria shrink from utilizing available health regulations for the control of the recalcitrant infectious patient. Although special laws somehow seem to be necessary, their availability does not presage their use.⁷ Furthermore, can local, state, or federal hospital or sanatorium services be restricted any more to the pleasant, cooperative patient? Can these facilities, as well as health departments,

Presented before the combined meeting of the Iowa Tuberculosis, Iowa Trudeau, Iowa Heart, and Iowa Public Health Associations, April 12, 1956, Des Moines, Iowa.

permit the infectious patient to walk out into the community at will?

Can we expect the judiciary and law enforcement agencies to cooperate or, perhaps, understand us if the professional attitude is different toward the individual with tuberculosis than toward the person with any other important communicable disease? Do we call for help from our co-workers in psychiatry, psychology, and psychiatric social service when our own efforts fail? What avails case finding and control pro-

grams^s in the face of a double standard? Who is recalcitrant?

Recalcitrants can create recalcitrance.
Therefore, who is recalcitrant?
Is it he; or is it I?
The problem we cannot deny.
The solution is right here.
"Twist our right and left ear."
Rapport is a state of mind
Requiring understanding in kind.
Has he?
Do we?

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CHEST PAIN in men under 40 is indicative of coronary arteriosclerosis. The incidence of this disorder in young men has increased in recent years. Coronary disease is particularly apt to develop in those who are tense, overweight, or stockily built; those who have profuse growth of hair on the chest and fingers; those who smoke heavily; and those with familial predisposition. The laboratory findings may show increased blood cholesterol or uric acid and decreased blood iodine or basal metabolic rate. Myocardial infarction may ensue.

Of 20 young male patients who had myocardial infarctions, 9 experienced angina pectoris after effort one week to nine years before infarction, while 11 had no premonitory symptoms. None of the patients died, and most of them were able to return to work within two to three months. Symptoms often disappeared completely.

After infarction, 17 of the 20 patients appeared to be extremely nervous. Reassurance is particularly important for these young patients, who often have families to support. The period of rest should not be unduly prolonged; complete correction of electrocardiographic changes and complete disappearance of chest pain on effort are not prerequisites for return to work. To prevent a second infarction, the patient is advised to avoid high fat intake, excessive smoking, and unusual exertion.

OSCAR ROTH, M.D., and ANNE V. PEPE, St. Raphael's Hospital, New Haven, Connecticut. Connecticut M. J. 21:12-15, 1957.

This department of THE JOURNAL-LANCET is devoted to reports on cases in which all the appropriate diagnostic criteria have been employed, the best known treatment administered and the results recorded. It is desired that these case reports be so prepared that they may be read with profit by physicians in general practice, hospital residents and interns and may be of considerable value to junior and senior students of medicine. This department welcomes such reports from individuals or groups of physicians who have suitable cases which they desire to present.

Carcinoma of the Adrenal Cortex

A Case Report

MILTON P. REISER, M.D., and
C. D. CREEVY, M.D.

Minneapolis, Minnesota

A 3½-YEAR-OLD WHITE GIRL was admitted to the University Hospitals on February 2, 1955. One year earlier, her mother noticed the growth of pubic hair; six months ago, acne; and three months ago, that her voice was becoming deeper. During the past several months, there was a pronounced increase in her weight and height.

Physical examination revealed a 3½-year-old girl with the physical structure of a 6-year-old (figure 1). She weighed 55 lb. and was 3 ft., 10½ in. tall. Her blood pressure was 110 systolic, and 70 diastolic. She had a masculine, very muscular build with hairy legs, arms, and face; there was an acneform rash on her face, chest, and back. Her skin was oily. The pubic hair was of feminine distribution; there was none on the chest or in the axillae. The hypertrophied clitoris was about 1 in. long. No masses were palpable in the abdomen or costovertebral angle. The rest of the physical examination was essentially negative.

The peripheral blood and urine were normal. The blood urea nitrogen was 21 mg. per cent; the carbon dioxide combining power was 23 mEq. per liter; the chlorides were 103 mEq. per liter; the serum sodium was 138 mEq. per liter; the blood glucose was 66 mg. per cent; and the serum potassium was 4.2 mEq. per liter. A roentgenogram of the chest was normal. An excretory

urogram revealed that the superior pole of the right kidney was displaced downward and laterally; both kidneys were normal (figure 2). Roentgenograms of the epiphyses of the wrists and knees revealed an estimated bone age of 8 years (figures 3a and b). Urinary 17-ketosteroid excretion was 322 mg. in twenty-four hours; the Allen test for dehydroisoandrosterone was positive. Seventeen hydroxycorticoids could not be determined due to excess pigment in the urine.



Fig. 1. Ten days post-operative; note pubic hair, muscular build, and acne.

MILTON P. REISER is instructor, and C. D. CREEVY is professor and director in the Division of Urology, Department of Surgery at the University of Minnesota.

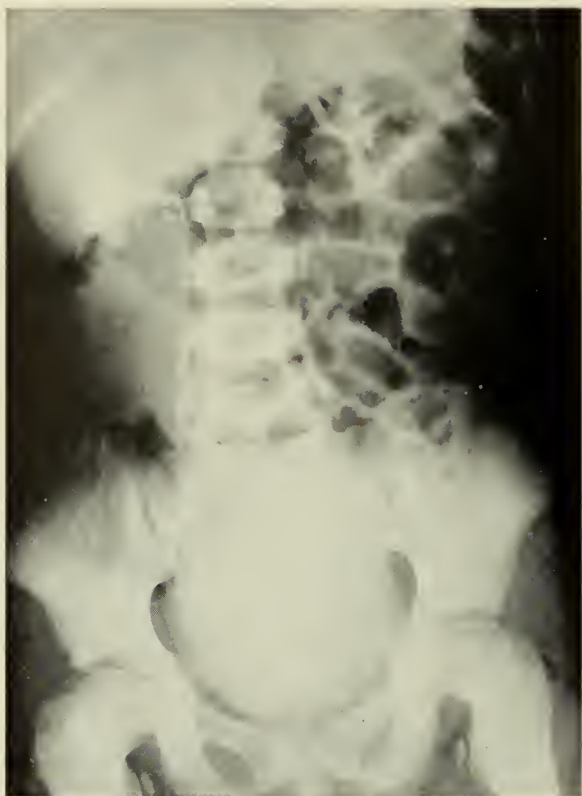


Fig. 2. Superior pole of right kidney pushed down and laterally.

On February 15, a right adrenal tumor was removed without difficulty through a modified Nagamatsu incision, with the twelfth rib and part of the eleventh rib resected subperiosteally. The pathologist reported: "Specimen consists of a tumor of the right adrenal gland which measures 8 by 7 by 6 cm. and weighs 150 gm. (figures 4 and 5). This appears to be encapsulated and is yellowish brown on cut surface with areas

of hemorrhage. It is moderately firm in consistency. Sections of multiple blocks of the tissue show that it is composed of large polygonal cells with reticular oval or round nuclei. The cytoplasm is dense and frequently shows small granules. It is eosinophilic. The cell boundaries are distinct. The nuclei vary considerably in size, and multiple nuclei are occasionally found in the cells. Mitotic figures are uncommon. There is considerable disruption of the tumor with collections of blood. This appears to be a tumor of the adrenal cortex which clinically was masculinizing. It is difficult to determine histologically which of these tumors is capable of metastases. The pleomorphism of the cells suggests that this may behave in a malignant fashion — carcinoma of the adrenal cortex."

The twenty-four hour urinary excretion of 17-ketosteroids was 1 mg. on February 24 and 0.8 mg. on March 1, the day of discharge.

Examination on April 7 revealed almost complete disappearance of acne and facial hirsutism; her voice was higher-pitched. On June 7, the urinary 17-ketosteroids were 1.8 mg. in twenty-four hours. On August 8, the twenty-four-hour urinary excretion of 17-ketosteroids was 1.8 mg. There was no decrease in the size of the hypertrophied clitoris.

DISCUSSION

Tumors of the adrenal cortex may be hormonal or nonhormonal. The former include adrenogenital, adrenocorticoid (Cushing's type), mixed (adrenogenital and adrenocorticoid), and feminizing.

Androgenic tumors occur more frequently in the young and 4 times as frequently in girls. In boys, precocious puberty occurs without tes-



Fig. 3a. Epiphyses of wrists.



Fig. 3b. Epiphyses of knees.

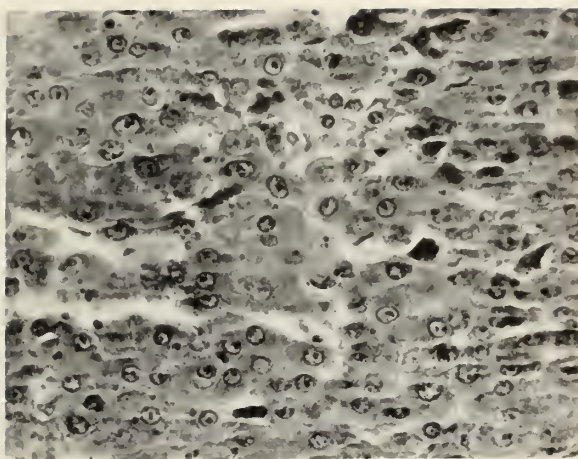


Fig. 4 (left). Carcinoma of the adrenal cortex. Fig. 5 (right). Photomicrograph: large polygonal cells of the carcinoma of the adrenal cortex.

ticular enlargement. The 17-ketosteroid excretion in the urine is increased, and there is often an elevation of the urinary estrogens without any discernible clinical manifestations. Cortisone lowers the elevated urinary excretion of 17-ketosteroids occurring in adrenal hyperplasia but has no effect in tumors of the adrenal cortex. The female child with an adrenal cortical carcinoma has pubic hair, advanced musculoskeletal development with premature closure of epiphyses, acne, low-pitched voice, and hypertrophy of the clitoris. In the adult woman, amenorrhea, hirsutism, atrophy of the breasts, and hypertrophy of the clitoris occur.

The excretory urogram may reveal depression or rotation of one of the kidneys. On occasion, perirenal or presacral air insufflation may delineate the tumor. Aortography is usually of

little value. Laminagrams may be of some aid. The failure of cortisone to decrease the 17-ketosteroid excretion in the urine is presumptive evidence of an adrenal tumor. The beta 17-ketosteroid fraction is increased in adrenal cortical tumors.

No special pre- or postoperative hormonal management is necessary, since there is no depression of function of the contralateral adrenal. These tumors may be removed through a transperitoneal, thoracoabdominal, or extraperitoneal lumbar approach.

Most of these tumors are friable and benign. Postoperatively, there is usually a complete reversal of the signs and symptoms except for the premature closure of the epiphyses, the hypertrophied clitoris, and, occasionally, the facial hair if shaving has been practiced.

MANY RETROPERITONEAL TUMORS are malignant. Of these, most are radio-resistant sarcomas. These tumors may remain localized to the retroperitoneal area for long periods of time. Tumors which invade the aorta are sometimes extremely painful.

Surgical removal of the tumor mass often relieves symptoms and, if complete, may be curative. The involved segments of the aorta and vena cava are excised with the neoplasm, and the aorta is replaced with homograft. A defect in the inferior vena cava may also be bridged by a homograft; however, maintenance of venous blood flow through the vascular transplant is difficult, and thrombosis of the graft may produce peripheral edema and pulmonary embolism. Therefore, simple closure of the venous ends without replacement of the excised segment may be preferable.

Postoperatively, roentgen-ray therapy may be advisable. Aortic homografts are not deleteriously affected by radiation.

E. STANLEY CRAWFORD, M.D., and MICHAEL E. DEBAKEY, M.D., Baylor University, Houston. Cancer 9:1085-1091, 1956.

Penicillin Anaphylaxis

SERIOUS REACTIONS to penicillin are occurring more and more frequently, and sudden death from sensitivity to this drug has been reported in at least 50 cases in the past two years.

It is questionable whether any form of penicillin should be given to a patient with a history of asthma, hay fever, urticaria, or allergic dermatitis. Before prescribing penicillin, the physician should ask the patient whether he has taken it before and, if so, whether its administration was followed by hives, itching, tingling, choking or burning sensations, edema, skin rashes, faintness, or chest discomfort. A hurried inquiry regarding a patient's possible allergic reaction to penicillin is not enough. It is imperative to go into detail relative to the appearance of any of the aforementioned symptoms and findings. If such reactions have occurred, some other antibiotic is indicated.

While the site of injection is usually the upper, outer quadrant of the buttock, because an injection is probably less painful in that area, this location is not desirable if an immediate reaction should occur. The upper arm is a preferable site, since, in this location, a tourniquet can be applied if alarming symptoms appear and if absorption should be retarded.

Patients who have had large doses of penicillin in the past and are possibly sensitized can be skin tested by applying a drop of penicillin to a scratched area on the skin. The appearance of an urticarial wheal or a reddened area around the scratch within fifteen minutes after the test

has been given indicates a positive reaction. Patch tests are much less accurate.

An emergency tray containing epinephrine, aminophylline, Histadyl or Benadryl in ampules, and suitable needles should be close at hand for use if needed. Oxygen inhalation and saline and dextrose infusions are often necessary. Patients given penicillin in the office should remain there at least fifteen minutes after the injection to guard against a reaction occurring on the street.

While the intramuscular injection of penicillin is the type that is most likely to cause anaphylactic symptoms, such as apprehension, dyspnea, rapid pulse, weakness, cyanosis, and unconsciousness, numerous cases are on record which have been precipitated by oral or nasal instillation.

It is well known that penicillin is given far too frequently for such minor conditions as raw throats, colds, and afebrile infections. This practice should be discouraged. Children are especially prone to penicillin sensitization from ointments or nose drops containing this antibiotic, and their use should be avoided if some other preparation can be used.

Before prescribing penicillin, a careful, detailed history of each patient is of the utmost importance in order to avoid giving it to those who may be allergic to it. This measure may be the means of preventing a sudden fatal reaction in an apparently healthy individual.

CYRIL J. GLASPEL, M.D.,
Grafton, North Dakota



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Histamine, edited by G. E. W. WOLSTENHOLME and CECILIA M. O'CONNOR for the Ciba Foundation jointly with the Physiological Society and the British Pharmacological Society, 1956. Boston: Little Brown & Co., 450 pages. \$9.00.

The Ciba Foundation undertook publication of this book as the record of a symposium held jointly by the Physiological Society and the British Pharmacological Society. The symposium was held in honor of Sir Henry Dale at the Wellcome Foundation and the Ciba Foundation in London in 1955. The meetings held at the Wellcome Foundation were divided into 3 parts: occurrence of histamine in the body, release of histamine, and the origin and significance of histamine in the body. The meetings at the Ciba Foundation were divided into 2 parts: the origin and fate of histamine in the body, and location of histamine in the body and mechanism of release.

This book is of a rather technical nature, and the data presented are related to basic science. The various subjects discussed are of interest to the clinician and the research worker. The relation of histamine to clinical and preclinical research prob-



lems makes this collection of recent investigative work of value to the physiologist, allergist, and others.

HERBERT W. JONES, JR., M.D.

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The Merck Manual of Diagnosis and Therapy, 1956. Rahway, New Jersey: Merck & Co., Inc. Ninth edition, thumb-indexed, 1870 pages. cloth \$6.75, deluxe \$9.00.

This compact book, well-known throughout the world to medical practitioners, medical students, and workers in many allied professions, has been revised and brought up-to-date. Some parts of the book have been completely rewritten, as, for example, the section on neuropsychiatric disorders. Although 300

pages longer than the eighth edition, use of extra thin paper keeps the book its usual handy size.

The wide coverage of the field of medicine, including hundreds of pertinent prescriptions and many useful reference tables, makes the book invaluable. New in this edition are excellent plates showing cardiac projections and relationships; sagittal section of the tooth; technic for intra-articular injections; tympanic membrane; pituitary-adrenal relationships; structural formula of typical adrenocortical steroid, hydrocortisone; horizontal section of the eye; tracheotomy technic; pulmonary projections and relationships; lumbar puncture technic; and gastrointestinal suction siphonage. These new plates add immeasurably to the usefulness of the book.

Listing the names of the editor and other members of the editorial board, including a Nobel prize winner, is a most commendable step forward. The index is considerably larger than that of the eighth edition and should meet any demands made on it.

All in all, *The Merck Manual* is a most useful reference book for persons in any branch of medicine.

J. A. MYERS, M.D.

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Cor Pulmonale in Infants

W. L. LEBIEN, M.D., L. G. PRAY, M.D.,
and M. H. POINDEXTER, M.D.

Fargo, North Dakota

PULMONARY HEART DISEASE may occur when the right ventricle is put under strain by obstructive lung disease. This condition has received rather scant attention in pediatric literature and the possibility that heart failure secondary to respiratory tract disease might develop in an infant or young child probably is not adequately considered on hospital wards. Congestive heart failure is not uncommon in pediatrics and is most frequently associated with congenital heart disease and pancreatic fibrosis.¹ Keith² analyzed his experience with 1,580 cases of congenital heart disease and noted that failure developed in 20 per cent at sometime, and, in 90 per cent of these, failure occurred during the first year of life. When severe respiratory tract disease is superimposed on an already distressed heart, the possibility of acute cor pulmonale should be considered.

In cor pulmonale, the right ventricle is dilated or hypertrophied as a result of pulmonary hypertension. The hypertension, secondary to lung disease, may be acute or chronic. It is generally believed that pulmonary hypertension occurs as the result of compression of the alveolar vessels and capillaries which run through the interalveolar septa. Hence, the development of cor pul-

monale can be either rapid or slow according to the progress of the primary lung disease. Cor pulmonale is not an easily recognized clinical condition in the pediatric age groups. Any or all of the usual signs of dyspnea, cyanosis, restlessness, refusal or inability to vocalize, difficulty in feeding, prominent neck veins, poor heart tones, an accentuated second pulmonic sound, an enlarged liver, and ascites may be present. Circulation times and venous pressures might be helpful, but the difficulty of accurate measurement in infants precludes their reliability. Likewise, an electrocardiographic finding of right-axis strain or deviation may or may not be helpful, since right-axis deviation is normally a common observation in infants and is frequently seen in congenital heart lesions where there is a left-to-right shunt. From the standpoint of diagnosis on the wards, the best approach appears to be the clinical judgment of the physician who keeps in mind the possibility of right heart failure in any child who has either (1) a congenital heart lesion with a superimposed pulmonary disease or (2) an infant or child with a normal heart who has severe involvement of the bronchopulmonary tree, such as pancreatic fibrosis, bronchiectasis, bronchiolitis or capillary bronchitis, congenital lung cysts, severe atelectasis or pneumothorax, or severe deformities of the thoracic cage.

Pathologically, the autopsy findings of a right ventricle thickness of 4 mm. or more in infants and 5 mm. or more in older children, plus evi-

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Read at the annual Founders' Day Program, Fargo Clinic, October 1956.

dence of hypertrophy and dilatation of the right auricle and evidence of pulmonary artery and pulmonary conus dilatation, are usually noted and confirm the clinical diagnosis.¹ X-ray findings may be misleading. The strained hypertrophied heart may actually appear to decrease in size as the lung disease progresses. The heart in an emphysematous chest of a severe bronchiolitis may often appear smaller because of the compression of the heart by the over-distended lungs.

It is interesting to speculate on one or two diseases of infants which could contribute to the development of cor pulmonale. Hyaline membrane disease with its rather extensive involvement of the alveolar tissue might cause considerable right-heart strain. This disease could precipitate right-heart failure and easily go unrecognized in view of the difficulties in diagnosis. Severe neonatal atelectasis could likewise contribute to pulmonary hypertension. Peace³ discussed such an instance when atelectasis and secondary right-heart failure closely simulated congenital heart disease.

A review of our hospital admissions on the Pediatric Service during the last four years revealed 14 patients in whom this disease developed. Table 1 shows the types of cases we have observed in which we felt that there was evidence of right-heart failure. I have selected 5 brief case histories from among this group to illustrate the various situations.

Case 1. C. D. was seen in our department on August 14, 1954, at age 2. She had a history of foul stools, repeated respiratory infections, poor appetite, and weight loss. A diagnosis of fibrocystic disease was subsequently made. Treatment with antibiotics and diet controlled the child fairly well until August 11, 1955, when she was admitted to the hospital with the recent history of increasingly severe dyspnea and cough. The chest was full of rales, the heart tones were muffled, and the liver edge was down. A roentgenogram indicated the presence of bilateral emphysema with patchy pneumonitis throughout the lung fields. There was a fairly small globular heart. There was moderate congestion of the hilar pulmonary vessels. The diagnosis of right-heart failure was made, and the child was digitalized, which resulted in a substantial relief of her dyspnea (figure 1).

Case 2. C. F., a 6-month-old infant, was admitted to

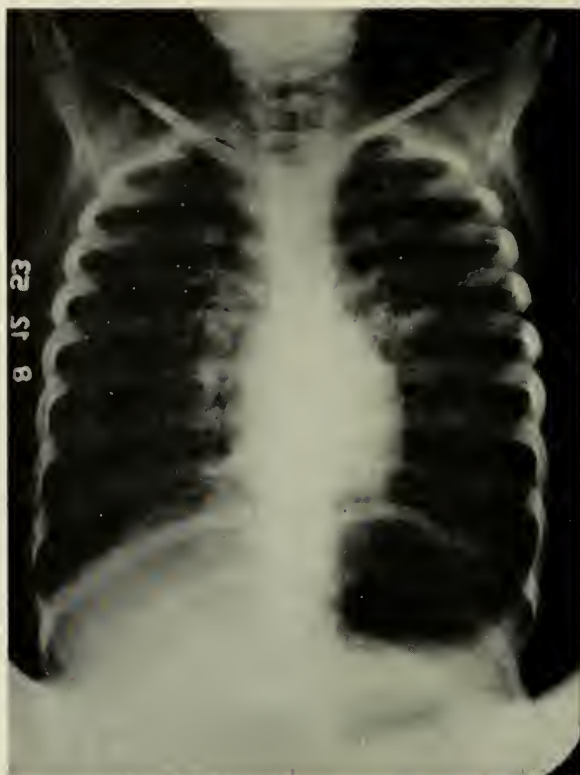


Fig. 1. Pancreatic fibrosis. Pulmonary emphysema. Relatively small heart. Congestion of hilar pulmonary vessels.



Fig. 2. Acute bronchiolitis. Prominent pulmonary artery segment.

TABLE 1
PATIENTS WITH COR PULMONALE

Acute bronchiolitis (capillary bronchitis)	5
Pancreatic fibrosis	2
Congenital lung cyst	1
Severe chemical pneumonia due to aspiration of furniture polish	1
Congenital heart disease with superimposed respiratory disease	5
	14

St. Luke's Hospital after a two-day history of a respiratory infection increasing in severity until the respirations became very labored on both inspiration and expiration. The child was becoming listless and had refused fluids. Examination revealed that the chest was full of fine wheezing and crepitant expiratory rales. The face was a little puffy. The liver edge was palpable, and the heart tones were indistinct with a somewhat accentuated second pulmonic sound. A chest roentgenogram indicated a prominence of the pulmonary artery segment. The lung fields were essentially clear. A diagnosis of acute bronchiolitis with right-heart failure was made. The child was treated with antibiotics and digitalized. On the day after hospital admission, considerable edema of the lower trunk and extremities was noted, which tended to confirm the earlier diagnosis of right-heart failure. After digitalization, the child rapidly improved, and recovery was uneventful (figure 2).

Case 3. R. B., a 2-month-old baby, was admitted to the hospital with a two-day history of coughing and choking. Initial studies revealed a right hemothorax. Subsequent aspiration of blood indicated the presence of a large right-lung cyst filled with bloody fluid. In spite of repeated thoracentesis, the cyst continued to fill with fluid. On May 23, 1956, a right lower-lobe lobectomy was done. After surgery, there was some atelectasis of the left lung. The heart tones were difficult to hear. The baby was very listless, and the liver edge was down. The baby was digitalized. However, about forty-eight hours after surgery, the infant coughed up frothy mucus and suddenly expired. Autopsy confirmed the diagnosis of a lung cyst and right-heart failure (figure 3).

Case 4. V. E., an 18-month-old girl, was admitted to the hospital a few minutes after drinking furniture polish and subsequently vomiting and aspirating the fluid. Within fifteen minutes, the child was in acute respiratory distress and her condition became progressively worse until her death on the eleventh hospital day. Her extreme pulmonary involvement, rapid irregular pulse, and a previously noted systolic murmur, presumably indicative of an interventricular septal defect, alerted us to the

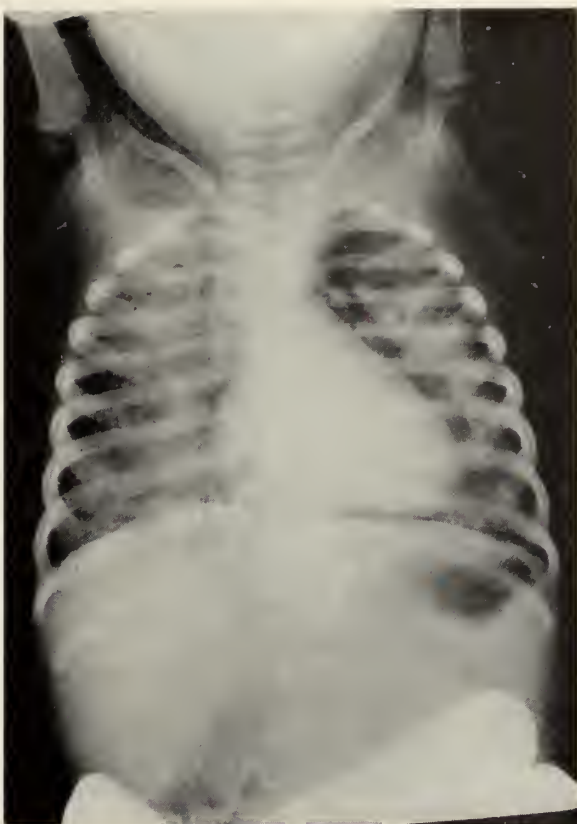


Fig. 4. Severe chemical pneumonia.

possibility of a failure, so she was digitalized on the fourth hospital day and maintained on the drug. In spite of numerous supportive efforts, the child's chest suddenly filled with moist rales on the eleventh hospital day and she expired. An autopsy confirmed the diagnosis of acute right-heart dilatation and failure (figure 4).

Case 5. B. E. was a 6-month-old infant with a known congenital heart lesion, and the diagnosis was probable interventricular septal defect. He contracted a rather severe bronchitis, and, subsequently, signs of failure developed (figure 5). The child was digitalized and treated with antibiotics. Recovery was uneventful. This child presents a fairly typical example of 6 patients with congenital heart disease who did fairly well until respiratory tract disease developed, which presumably put too much of a burden on an already struggling heart. This is particularly apt to be the case when heart lesions suggest the presence of a left-to-right shunt, resulting in an increased load on the right side of the heart.

The dosage of digitalis varies considerably with route of administration, as well as the particular digitalis preparation used. Digoxin appears to be one of the more satisfactory preparations because of its relatively rapid action and somewhat shorter duration. Keith² considers Digoxin and Gitalgin preparations with similar characteristics possessing a good margin of safety between therapeutic and toxic doses. Sapin and associates⁴ found Digoxin a satisfactory digitalis product for use in infants and children. The suggested digitalizing dosage of Digoxin is .075 mg. per kilogram (0.35 mg. per pound) given orally or intramuscularly in 3 to 4 divided doses the first twenty-four hours. The daily maintenance dose is about one-fifth the digitalizing dose.



Fig. 3. Cyst of right lung.



Fig. 5. Congenital heart disease. Bronchitis.

SUMMARY AND DISCUSSION

Five typical cases of cor pulmonale have been briefly presented, each representing one of several possible ways in which acute or subacute right-heart strain might develop in an infant. In most instances, failure was precipitated by pulmonary disease capable of compressing the alveolar vascular bed to the point of raising the pressure in the right heart — pulmonary vascular system — resulting in right-heart strain, dilatation, hypertrophy, and failure. In somewhat over one-third of the patients, a congenital heart lesion no doubt contributed to the failure. It might be well to remind ourselves that the same possibility should be considered in newborn infants who have either atelectasis, pneumothorax, or hyaline membrane disease. Diagnosis depends on clinical judgment, and if the physician cannot be certain of the diagnosis, he probably should digitalize the patient. Periods of medication have usually been short during some acute disease, and treatment should be reasonably safe.

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MELENA may occur in newborn infants as a result of swallowing maternal blood before or during birth. The condition may be differentiated from melena due to hemorrhagic disease of the newborn by a laboratory test to distinguish the fetal from the adult hemoglobin in the feces.

Between 1 and 2 oz. of blood must be ingested to produce melena. Blood may be swallowed either in utero or in the vagina during delivery.

Exogenous melena is always preceded by antepartum hemorrhage. The first bloody stool is passed on the first day of life, usually within twelve hours after birth. Melena may continue for as long as sixty-four hours. Usually, about 8 bloody stools are passed. The infant remains well and does not become anemic.

In contrast, melena associated with hemorrhagic disease almost always begins more than twenty-four hours after birth. Usually, only about 4 blood-containing stools are passed, and duration of melena is less than thirty-six hours.

No treatment is necessary for melena due to swallowed blood. For melena with hemorrhagic disease, however, immediate blood transfusions may be required. Serial hemoglobin determinations are probably advisable in all instances of melena neonatorum.

DONALD COURT, M.D., The Princess Mary Maternity Hospital, Newcastle upon Tyne, England. *J. Obst. & Gynaec. Brit. Emp.* 64:89-93, 1957.

Spinal Cord Tumors in Children

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SPINAL CORD TUMORS occur much less frequently before the age of 15 than in adults. Hamby,¹ in 1944, in a review of the world's literature, found intraspinal tumors in 214 patients under 15 years of age. Anderson, in 1953,² reporting from the Los Angeles Children's Hospital for a period of twenty-two years, found 164 children under 14 with brain tumors and 21 with intraspinal tumors—a ratio of about 1 to 8. Bailey³ estimated a ratio of 1 cord tumor to 20 brain tumors in the younger group, in contrast to a 1 to 6 ratio in adults. Hamby¹ also pointed out that the pathology of cord tumors differs percentage-wise between childhood and adult groups. Glioma and extradural sarcoma, both generally unfavorable for surgical treatment, were the commonest types, and congenital tumors, neurofibromas, and meningiomas were next in frequency. In adult life, neurofibroma is generally considered to be the commonest cord tumor with meningioma second, and glioma third.

USUAL CLINICAL FINDINGS

Bennett⁴ first reported that tumors of the spinal cord in children need not produce early objective neurologic signs, such as weakness or numbness of the extremities. Ingraham⁵ pointed out that the examiner must always be alert to the possibility of cord tumor in a child with weakness of the lower extremities, pain in spine or legs, or any ill-defined state suggesting the chance of spinal cord disease (table 1).

The combination of spine and leg pain, with or without stiffness and limited motion of the neck and back, is probably the most common group of presenting symptoms. Pain is often more pronounced at night, and coughing and sneezing almost invariably cause radiation into the arms, trunk, and legs. Objective weakness

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TABLE 1
SYMPTOMS AND SIGNS OF SPINAL CORD TUMOR

1. Spine and leg pain
2. Weakness and numbness of lower extremities
3. Any ill-defined state suggesting the chance of spinal cord disease
 - a. Back and spinal root pain plus spasm of back and hamstring muscles
 - b. Rapidly increasing weakness and numbness of parts below the tumor level
 - c. Fever, stiffness of back, and cells in spinal fluid
 - d. Impaired function of bowels or bladder

and numbness of the lower extremities are usually slow to appear, and during this interval, abnormal reflexes or other unusual neurologic signs may not be noted. Of the 21 children with spinal cord tumors reported by Anderson,² 4 were less than 2 years of age and were brought to the hospital because of irritability, fretfulness, and a progressive weakness of the legs that had appeared rather suddenly and was always accompanied by fever. Three older children described a fairly painless but progressive loss of sensation and strength in the legs of two weeks' to six months' duration. Impaired function of bowels or bladder occurs in about 50 per cent of reported cases, manifested by stubborn constipation, urinary incontinence or retention, nocturia and frequency, or a relaxed anal sphincter.

COMMON ERRONEOUS DIAGNOSIS

Bennett,⁴ in 1927, described 4 patients with proved spinal cord tumor in whom back and spinal root pain and spasm of back and hamstring muscles persisted for several years before any neurologic signs were observed. It should be stressed that such a situation may not be uncommon. It is supported by numerous authors and was true with our patient (table 2). Com-

TABLE 2
COMMON ERRONEOUS DIAGNOSES OF SPINAL CORD TUMORS

1. Hysteria
2. Congenital lordosis or scoliosis
3. Tuberculous spondylitis
4. Herniated intervertebral disk
5. Multiple sclerosis
6. Postpoliomyelitis
7. Transverse myelitis, Guillain-Barré syndrome
8. Acute spinal poliomyelitis

mon erroneous diagnoses include hysterical states, rapidly increasing weakness and numbness of parts below the tumor level, which may be confused with transverse myelitis or Guillain-Barré syndrome, and the tumor may occasionally produce a syndrome suggestive of acute spinal poliomyelitis, with fever, stiffness of neck, and cells in the spinal fluid.

SPINAL FLUID EXAMINATION

Spinal fluid examination is essential in the investigation of a child whose complaints, though obscure, even remotely suggest the possibility of spinal cord tumor. Xanthochromia, increased protein content, or both are present in a high percentage of patients with cord tumors. The Queckenstedt test is apt to be equivocal, and, occasionally, the spinal fluid will be normal. Repeated lumbar taps may produce no spinal fluid, as was the case in our patient. This finding is, of course, highly significant. Because the symptoms of the tumor may be greatly increased after lumbar spinal puncture, it should not be performed on suspicious cases if proper facilities are not available for laminectomy to be carried out within a few hours. Elsberg⁶ and Rodin and associates⁷ state that if the patient's symptoms increase greatly after lumbar spinal puncture with removal of spinal fluid, it can reasonably be assumed that the tumor is extradural or intradural.

ROENTGEN EXAMINATION

Although roentgenograms of the entire spine did not help us with our patient, it is reported that pathologic changes can be demonstrated in a high percentage of cases (table 3). The entire spine should be examined because cervical or thoracic tumors tend to cause symptoms confined to the legs or other low segments for long intervals before ascending as cord compression increases.

TABLE 3
USUAL X-RAY FINDINGS IN SPINAL CORD TUMORS

1. Erosion of rib ends, vertebral bodies, lamina, or pedicles
2. Widening of the spinal canal, with increase in interpedicular distance
3. Enlarged intervertebral foramina, characteristic of neurofibroma
4. Kyphosis and scoliosis
5. Loss of normal cervical or lumbar lordosis, characteristic of neurofibroma
6. Striation of the vertebral body, characteristic of hemangioma
7. Increased density of vertebra
8. Spina bifida, characteristic of lipoma, also may be associated myelomeningocele

MYELOGRAPHY

Myelography has been proved useful by several investigators for localization of a tumor in questionable cases. The lowermost extension of a spinal tumor may be accurately found by this method. Myelography is of particular value in a child because the level of sensory or motor loss suspected by neurologic examination may be quite inaccurate due to limited cooperation. Myelography was not carried out in our patient, as we felt that, with our other findings, it was not necessary.

CASE REPORT

The patient, a 10-year-old white boy, first became sick about two months before seeing one of us. His first complaints were pain in the back, in the region of the right scapula, then over the left scapula, and involuntary urination. At that time, he was seen by another physician who thought he had a muscle infection or disease and started him on physical therapy. Little change was noted in his condition until about two weeks before we saw him, which was about six weeks after onset of first complaints. At this time, onset was rapid with progressive headache, stiff back, weakness and then paralysis of his legs, and involuntary voiding.

First examination revealed a moderately ill child with paralysis of both legs. Reflexes were hyperactive. Lumbar spinal puncture revealed a spinal fluid protein of 500 mg. per cent but no cells. His symptoms increased markedly after the spinal puncture. When I first saw him, which was within a few hours after the spinal tap and when a spinal cord tumor was first suspected, he was acutely ill. His back and neck were stiff and painful, and it was difficult for him to sit down. He had a normal amount of perspiration on his head, shoulders, and arms, but there was more below the second dorsal segment. Both legs were paralyzed. Reflexes were normal in the upper extremities, but knee jerks, abdominals, cremasterics, ankle jerks, and Babinski's were absent. He appeared to have diminished skin and deep sensations below the level of the upper chest, which was about the same level as the perspiration differential mentioned previously. He was unable to void, and priapism was present. Several lumbar punctures revealed no spinal fluid. Injection of an opaque medium into the lumbar subarachnoid area was unsatisfactory. Blood and urine studies were noncontributory. His rectal temperature was 100, and x-ray films of the skull and entire spine were reported normal. At this time, it was decided that he had a spinal cord tumor in either the lower cervical or upper dorsal areas, so he was taken to surgery immediately.

Laminectomy, performed by Dr. Leonard Titrud, revealed a dark-brownish mass lying extradurally beneath the annulus fibrosis on the right side of the spinal cord at the level of the second dorsal vertebra. It was causing extreme pressure on the cord and extended from the posterior to the anterior part of the spinal cord. It was about 2½ in. long, 1 in. thick, and 1 in. wide. Most of the tumor was removed, so that the cord was thoroughly decompressed, and good pulsation of the dural sac was noted. The dura was opened after most of the tumor had been removed, and the cord seemed normal. The patient had an uneventful postoperative course. As the tumor was an undifferentiated sarcoma, x-ray radiation was begun nine days after surgery and continued each

day for twelve days. This therapy was directed to the lower cervical and upper dorsal areas of the back. Physical therapy was also started at about this same time. By the time of discharge, which was approximately three weeks after surgery, reflexes were present in the legs, and he was beginning to stand and walk with the aid of crutches.

According to studies by Lane,⁷ 22 of 39 patients with proved spinal cord tumors died three months to eight years after onset of symptoms. Our patient did well until about seventeen months after surgery, which was about nineteen months after the onset of his first symptoms. He then began to have a great deal of pain in his left shoulder and left arm, and soon a left Horner's syndrome developed. Further x-ray therapy, oral and intravenous triethylene melamine, and Hydrocortone failed to relieve the pain or arrest the disease. He died about three months later. Autopsy revealed that both lungs had been almost completely replaced by tumor tissue. The tumor was composed of small, densely packed spindle-

shaped cells with an elongated, oval nucleus. The cytoplasm was poorly defined. There was no evidence of tumor anywhere else in the body.

A disheartening fact in tumors of this type is that, although symptoms of the spinal cord may be the only symptoms for a considerable period, the disease actually may arise in mediastinal glands too small to be detected by roentgenograms.

SUMMARY

An undifferentiated sarcoma, which was removed from the extradural space at the level of the second dorsal vertebra, eventually caused the death of a 10-year-old boy twenty months after surgery.

Treatment at present is confined to local removal of the tumor followed by investigation of the entire body for more tumor tissue and further treatment with x-ray, cortisone, and TEM.

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ADENOCARCINOMAS may develop in the esophagus or at the esophageal-gastric junction as well as in the stomach.

In some persons, portions of the esophageal mucosa, usually in the lower third of the esophagus, fail to undergo squamous transformation before birth and instead remain columnar-celled, like gastric mucosa.

Esophageal adenocarcinomas probably originate in these areas. The tumors usually affect the lower third of the esophagus, in contrast to squamous-cell tumors, which occur with equal frequency throughout the esophageal length.

Of 23 esophageal adenocarcinomas without hiatal hernias, 1 was in the upper third of the esophagus, 3 were in the middle third, and 11 were in the lower third; 8 involved most of the lower half. Several of the tumors of the lower third were separated from the cardia by radiologically normal mucosa.

Tumors involving the cardia may arise from the stomach or extend from gastric mucosa in the esophagus. True origin is, however, often difficult to determine. Results of surgery for these junctional neoplasms, which cannot be classified definitely as either gastric or esophageal, are good.

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The Nature of Bronchial Asthma: Important Therapeutic Measures

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ASTHMA is the result of inflammatory disease of the bronchi and is characterized by cellular infiltration, thickening of basement membranes, hypertrophy of bronchial smooth muscle, narrowing of air passages with presence of mucus, and raising in folds of the bronchial lining. At bronchoscopy, the mucous membranes in the lower air passages appear red, swollen, and covered with mucus; the tissues are hypersensitive; and the lumina may be narrowed. The appearance is the same, regardless of the underlying cause; and the bronchoscopist cannot differentiate causes of asthma by inspecting the air passages.

TYPES OF ASTHMA AND RATIONALE OF TREATMENT

In general, the types of asthma may be classified as allergic, intrinsic, or neurogenic. They occur singly or in combination. Factors which may precipitate attacks of asthma may be respiratory infections, allergens of inhalants, foods, and drugs and such nonspecific irritants as cold air, sudden changes in temperature, exertion, drafts, hard laughing, smoke and other fumes, dusts, and nervous stress.

The objective of treatment should be not merely palliation but cure. Although cure cannot be predicted, frequently it can be obtained. As physicians, we all have encountered patients of various age groups who have had asthma in the past but who are no longer afflicted. Tending to forget that asthma often can be cured, we are mistakenly satisfied with mere suppression of asthmatic symptoms. Cure depends on finding the causes of asthma and removing them, correcting complications, and cooperating with nature in its efforts to bring about healing in each case.¹

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Healing through rest. Healing is easier said than accomplished; yet, the principles and procedures necessary to attain a cure are known and in many instances can be applied, assuming that irreversible changes have not occurred before investigation and treatment are started. Emphysema, of course, is irreversible, but bronchitis is not. Nature can heal bronchi as easily as it can an incision in skin and muscle or a fracture of a bone. Healing is dependent on rest for the tissue and never occurs if the tissue is constantly irritated by coughing, smoking, or the inhalation of specific allergens, nonspecific dusts, or other respiratory irritants. An inflamed eye cannot heal if it is being vigorously rubbed, and no more can bronchi heal if they are constantly or repeatedly irritated by coughing. Prophylaxis of asthma depends on avoiding anything which induces coughing. For one who has asthma, to cough is to wheeze. Coughing induces bronchospasm and intensifies bronchitis. Asthma cannot be controlled in the presence of coughing.

Treatment for particular types. What should the patient be told about controlling his cough and asthma? An explanation to the patient with asthma should begin, as mine has done, with a description of the lesion in the air passages that is to be healed. The physician should let him know what he is trying to accomplish and explain how he is going to proceed to remove the causes of the inflammation, be they allergic, infectious, intrinsic, or neurogenic. I will cite some examples with the procedures to be followed. Allergic asthma, such as might be due to cat hair, necessitates avoiding cats and vacuuming areas in the house where they have been. Allergic asthma caused by eating shrimp or ingesting aspirin requires meticulous avoidance of such foods and drugs. Seasonal asthma that is caused by fall pollens should be treated by hypersensitization or, even better, by going to an area free of such pollens. Other examples could be cited, but these illustrate typical procedures to follow in removing or treating the causes of allergic asthma.

Intrinsic asthma is the result of many contributing factors, chief of which are respiratory infections. Occupational dusts or other irritating inhalants, for example, tobacco, also may cause intrinsic asthma. This type of asthma may be complicated by sinusitis and obstructive pneumonitis and, especially, by chronic and subacute bronchitis. The removal or treatment of complications is a paramount requirement, and, in some instances, surgical measures, antibiotics, or a change of residence, occupation, or climate is indicated. Each case is a separate problem and must be investigated and treated not by formula but according to its individual needs.

Neurogenic factors in asthma must be carefully evaluated. Rarely is asthma purely neurogenic, but some degree of anxiety and panic is to be expected if the patient cannot breathe freely. Anxiety associated with asthma can be greatly minimized by teaching the patient to give himself a subcutaneous injection of epinephrine whenever necessary and especially at the start of an asthma attack. He then can stop an attack promptly without depending on a physician, nurse, or member of his family to administer this harmless relief.

EXPULSION OF MUCUS

Coughing. Since coughing aggravates asthma, a way of daily living must be developed which minimizes the necessity for coughing. Coughing is a protective device that warns the asthma patient to get away from the irritant—smog, as an example—that affects the air passages. The patient with asthma must therefore avoid breathing tobacco smoke, refrain from smoking tobacco or medicated asthma cigarettes, and shun fumes, dusts (especially feather dusts), and inhalant allergens to which he has demonstrated a sensitivity. Since exertion and hard laughing induce coughing, they too must be avoided. Sudden changes in temperature, for instance, going out of a warm house into cold outside air, commonly cause cough, asthma, and dyspnea. To counter sudden changes of temperature, the patient should be instructed to roll up a wool scarf into a bean-bag sized “pillow,” hold it over his nose and mouth, and breathe through this pad when changing from warm to cold or cold to warm.

Respiratory infections are common causes of cough, bronchitis, and flares of asthma and must be avoided or minimized. Keeping warm and dry, avoiding excessive fatigue, and staying away from persons who have colds are of more prophylactic value than antihistamines, cold vaccines, vitamins, or antibiotics. Wearing a mask when in close proximity to people who have

colds is strongly recommended, although this precaution has never been as popular as it should be. Wearing gauze masks is an accepted custom in the operating room and in the nursery, but is a neglected safeguard against the spread of colds in families or other groups of persons in close contact with each other. The patient who has asthma should be taught to go to bed at the beginning of a cold. From experience, he knows that a cold means increased coughing, bronchitis, and exacerbation of asthma. In bed, the patient is quiet; he avoids sudden changes in temperature; and his natural resistance to virus infections can go to work unhampered by chilling and fatigue. It is the best way known to ward off the consequences of neglect, especially if asthma tends to be among them.

Overcoughing (to raise clear mucus). Most patients and, indeed, many physicians do not understand the protective nature of mucus in the air passages. They believe that mucus is noxious and must be coughed up as fast as it is formed. It is common to see such patients with the largest-sized box of paper tissue on their bed table and a wastebasket overflowing with tissue containing mucus that they have laboriously coughed up day and night. They imagine they will be smothered or drowned by accumulations of mucus in their lungs, and they cough so hard to get it out that it is not uncommon to fracture a rib in so doing. The more they cough to raise mucus, the worse their asthma becomes.

Such patients need careful re-education. They should be told that mucus is a normal secretion of the mucous membranes lining the air passages, that it is a protective device, nature's ointment over irritated membranes, and secreted there so that dust, smoke, fumes, cold air viruses, and bacteria contact the mucus and not the inflamed, unprotected membrane itself. It should not be coughed out; as fast as mucus is coughed out, more is secreted to take its place. Nature needs the protection of mucus and will not let the air passages dry out. Often, one sees the vicious cycle of coughing to raise mucus, secretion of more mucus, resumption of coughing, and so on, with mucus raised as fast as it is formed, ad nauseam if not ad infinitum.

Expulsion of excess mucus without coughing. The explanation of the protective and physiologic nature of mucus must be followed by describing to the patient how nature gets rid of any mucus in excess of its needs. He should be told how cilia lining the air passages raise the excess secretions containing dust or smoke particles or viruses and bacteria and their by-products. When this excess collection of mucus is

raised by cilia to just below the epiglottis, a warning tickle is felt. Now the patient must make a decision, and he must be told the correct method to choose for raising the mucus the rest of the way over the epiglottis. The common, incorrect, and unphysiologic procedure is to cough hard as soon as the tickle is felt, raising not only the excess secretion in the upper part of the trachea but also all the other loose secretions in the lower air passages, after which more mucus is secreted all over again. The correct, harmless, and nearly physiologic method is to open the mouth and gently clear the throat as one might do before answering a telephone. This gentle maneuver raises only the excess secretion that nature no longer needs, and it does not result in hard coughing, irritation of already inflamed membranes, and bronchospasm.

Gentle treatment of irritable air passages is just as important as the gentle handling of tissues at operation. Gentleness promotes healing; hard coughing prevents healing.

Dehydration. Patients with asthma easily and frequently become dehydrated, in which case their mucous secretions are thick and tenacious and seem to stick half way up the trachea. Mucous plugs and casts of bronchi may form and

be difficult to raise even with hard coughing. To correct or prevent dehydration associated with asthma, the patient should be instructed to drink a glass of water or the equivalent amount of juice, soup, coffee, tea, or other beverages each waking hour. These fluids frequently have to be supplemented in the hospital by 2 liters or more of intravenous fluids each day until the patient is adequately hydrated. The patient should understand that the main difference between thin, easily raised mucus and thick, tenacious, mucous plugs and casts is water. Expectorants, such as iodides and ammonium chloride, are of no use to a dehydrated patient but frequently help the well-hydrated one.

SYMPTOMATIC TREATMENT

No medication cures asthma. Many drugs give welcome, symptomatic relief, but these should be used to keep the patient alive and more comfortable while the fundamental problem—finding and removing or controlling the causes and complications of his asthma—is being undertaken and, in many instances, accomplished.

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SACCULAR ANEURYSMS, usually of the intracranial carotid artery, are the cause of most cases of unilateral frontal headache with oculomotor paralysis, but the condition may result from diabetes, paracrinoid tumor, leukemia, or so-called ophthalmoplegic migraine.

Patients with headache and oculomotor paralysis due to aneurysm are usually less than 60 years of age. Average age of diabetic patients with these symptoms is 64 years. Usually, other signs of neuropathy are observed in the diabetic patients. No spinal fluid abnormalities are seen with diabetes, and the patient's neck is not stiff.

Carotid arteriograms aid the differential diagnosis. However, an arteriographic examination is dangerous in diabetic patients because the blood vessels are fragile.

In patients with paracrinoid tumors, roentgenograms may show erosion or exostosis of the base of the skull, displacement of the carotid artery, or other changes. Electroencephalograms are sometimes helpful. With headache and ocular defect of leukemic etiology, lymphocytosis is noted in the spinal fluid, and other evidence of leukemia is seen. In patients with ophthalmoplegic migraine, the syndrome recurs cyclically and the patient recovers from each attack quickly and completely. Meningism is not observed when the syndrome is of nonaneurysmal origin.

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Role of Biopsy in the Diagnosis of Pleural Disease

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THE TRADITIONAL DIAGNOSTIC APPROACH to a patient with a pleural effusion often leads to the correct etiologic diagnosis only with considerable delay, and, occasionally, it fails.¹ Some of the difficulties have been overcome by the development of more precise diagnostic laboratory techniques and by the increasing empirical knowledge of the clinical dynamics of pleural disease which has been fortified by thorough statistical analysis.²⁻⁴ The observation that a pleural effusion in young adults is frequently followed by the development of pulmonary tuberculosis has led to the preventive practice of regarding such patients as actually suffering from active pulmonary tuberculosis and treating them accordingly.⁵ It also has become a conventional clinical rule to face the occurrence of a pleural effusion in an older patient as an ominous manifestation of malignant disease. The traditional laboratory methods applied to this situation may fail to provide a definite diagnosis, as has been exemplified by a recent report from the Mayo Clinic.¹ Evidence of malignant cells in the pleural fluid could be demonstrated in only a little more than half of the patients in whom carcinoma was later proved. This may not merely reflect on the inadequacy of the technic but also on the mode of pathogenesis of a pleural effusion in malignant disease, which does not necessarily include the shedding of malignant cells

into the pleural space. Invasion of lymph channels or infection distally to bronchial obstruction may be responsible for the nonspecific character of the fluid. Nevertheless, it is likely that the utilization of biopsy procedures should increase the diagnostic yield in neoplastic as well as in inflammatory disease. The evidence of several reports supports this assumption.⁶⁻¹²

Surgical biopsy of the pleura has not only provided practical diagnostic aid, but has also supplied data¹³ for the study of the pathogenesis of tuberculous pleural effusion. It is of interest that Stead and associates¹³ found histologic evidence of tuberculosis in only 15 out of 24 patients with a clinical diagnosis of tuberculosis in whom a biopsy specimen was obtained during decortication early in the course of the disease. Such results may also suggest the need for a reappraisal of the sometimes too readily applied axiom that any idiopathic pleural effusion in the young adult must be treated as tuberculosis. Close follow-up examination of such patients, in whose evaluation the difference between conventional clinical judgment and morphologic tissue analysis has become apparent, is of great practical and theoretic importance.

Surgical biopsy of the pleura, especially by the "small thoracotomy" technic, is considered a minor surgical procedure which can be performed without hazard.¹² It has the advantage of yielding a large specimen which can also be examined bacteriologically. Nevertheless, this method requires the skill of a thoracic surgeon. It may necessitate general anesthesia and, occasionally, tracheal intubation, and it may be associated with some postoperative morbidity. These circumstances should not be considered serious disadvantages of a diagnostic procedure which offers the promise of a high diagnostic yield, but a surgical operation may be avoided if, first, the simpler and less traumatic needle biopsy of the parietal pleura is attempted. After we started to

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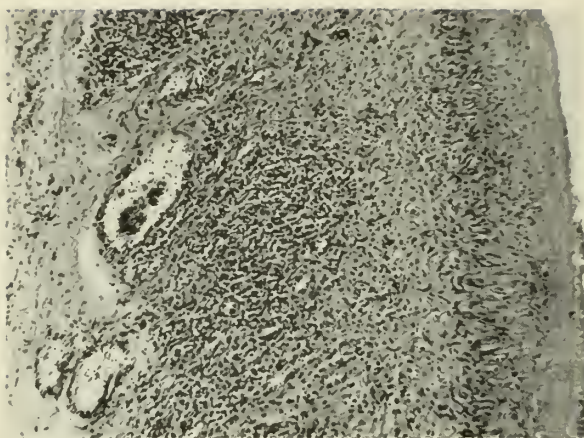


Fig. 1. Surgical biopsy of parietal pleura, typical of rheumatoid pleuritis. Note layer of palisading cells. (Reproduced with permission of New England J. Med.)

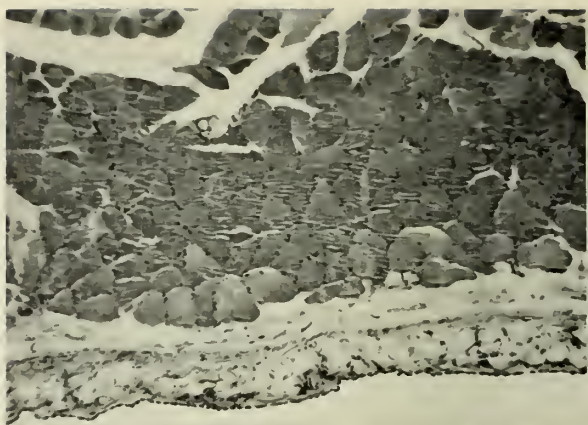


Fig. 2. Section of intercostal muscle, endothoracic fascia, and parietal pleura obtained at autopsy from a patient without pleural disease.

use the Vim-Silverman needle for this procedure, we rarely found subsequent surgical biopsy necessary. Prior to our experience with needle biopsy, surgical biopsy had proved to be of great diagnostic assistance to us.^{9,11} For example, it led to the rare diagnosis of rheumatoid pleuritis (figure 1) in 1 patient. In some patients, the strong clinical suspicion of tuberculosis could be abandoned, or, in others, a caseating granuloma, especially in an older patient, was contrary to the expectation of the clinical judgment.

Needle biopsy of a diseased organ, which has become one of the most important diagnostic procedures in diseases of the liver and kidney, quite obviously must have limitations when the

organ is normally as thin as the parietal pleura (figure 2) and, moreover, is bordered by the lung, which, if injured by the needle, could lead to serious iatrogenic disease. However, if the parietal pleura is thickened by a pathologic process and the lung is separated from the chest wall by fluid, then needle biopsy can be performed with maximum safety.

The technic used with the Vim-Silverman needle is simple (figure 3). Details of the method have been described previously.¹¹ The following rules should be heeded:

1. Blood coagulation should be normal.
2. The biopsy site should be selected fluoroscopically.

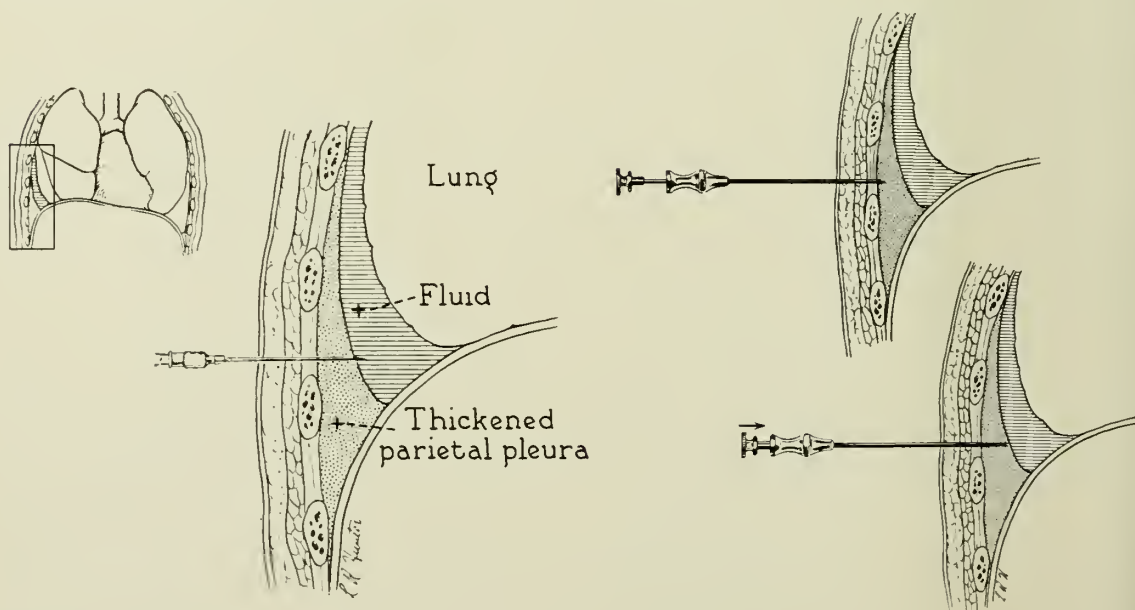


Fig. 3a (left). Anesthesia needle dipping into pleural space. 3b (right). Vim-Silverman needle before and after advancement of the split needle. (Reproduced with permission of the publisher, New England J. Med.)

3. Biopsy should only be performed if it can be adequately predicted that the lung is separated from the chest wall by fluid or a broad layer of fibrotic pleura. It should not be performed if the only evidence of pleural disease is an obliterated costophrenic angle.

The obtained specimen may be small and usually contains muscle. It may be only 2 to 3 mm. long, and, therefore, it may be necessary to obtain 2 or 3 specimens, possibly with the needle pointing into different directions. With careful technic, complications should be rare. Only 1 of our patients suffered a complication in the form of a hemorrhage into the pleural space, which only required aspiration. Otherwise, discomfort in all has been absent or slight.

This report deals with the first 45 consecutive patients who were subjected to needle biopsy of the pleura, in some cases, 2 or even 3 times. The biopsy was performed as soon as a tuberculous or malignant effusion was suspected. When the clinical findings were unequivocally diagnostic of congestive heart failure, pulmonary infarct, or pneumonia, biopsy was omitted.

The histologic diagnoses fell into 4 groups (table 1). A caseating granuloma was found in 6 patients, malignant tumor in 8, and nonspecific changes in 28. In 3, the specimen obtained was insufficient.

The diagnosis of tuberculosis was made when a caseating granuloma was found (figure 4). Although bacteriologic studies of the biopsy specimen were not successful or were not performed because of the small size of the specimen, the diagnosis of tuberculosis appeared justified on the basis of collateral clinical evidence in all patients. The skin test was positive with tuberculin and negative with coccidioidin, histo-

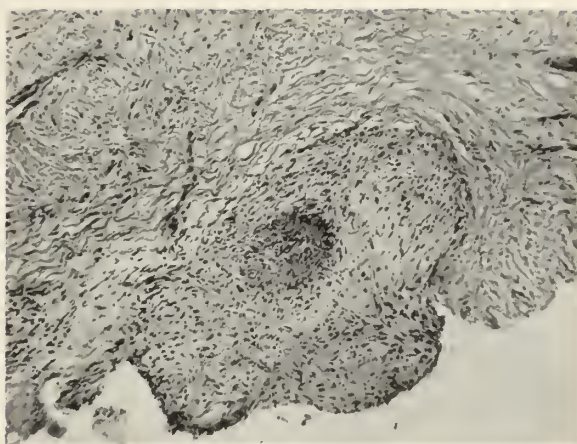


Fig. 4. Needle biopsy of the pleura. Caseating granuloma (125x enlarged).

plasmin, and blastomycin. In most cases, bacteriologic evidence of tuberculosis was obtained later.

The chief advantage of biopsy lies in the possibility of its promoting an early diagnosis. For example, in 1 patient, the diagnosis of tuberculosis was made three days after admission, while the cultures of the pleural fluid turned positive only six weeks later. The group of patients with tuberculous pleural effusion also includes a 64-year-old patient in whom the presumptive diagnosis was malignant disease until biopsy was obtained. Another patient with lymphosarcoma was suspected of having lymphomatous involvement of the pleura, but pleural biopsy showed a caseating granuloma. Another patient had been subjected to open biopsy, and a diagnosis of fibrinous pleuritis was made. Because of the strong clinical suspicion of tuberculosis, a needle biopsy was then performed which showed a caseating granuloma. Of the 6 patients in whom a positive biopsy was obtained, 5 had a clinical course which appeared to be typical of primary tuberculous effusion (table 2). They were febrile for some days or weeks, had mild chest pain, and showed neither clinical evidence of pulmonary tuberculosis nor involvement of any other organ. In several other patients with a similar syndrome, the biopsy was negative. This seemed surprising, but the subsequent clinical course and the appearance of clues pointing to a differ-

TABLE 1
NEEDLE BIOPSY OF THE PARIETAL PLEURA

Lesion	No. patients	No. biopsies
Caseating granuloma	6	9
Malignant neoplasm	8	13
Nonspecific inflammation of fibrosis	28	54
Insufficient specimen	3	3
Total	45	79

TABLE 2
ACTIVE TUBERCULOSIS (12 PATIENTS)

Clinical	Biopsy diagnosis		
	Caseating granuloma	Non-specific	Insufficient
Primary pleural effusion	5	—	—
Bilateral transient pleural effusion with ascites and lymphadenopathy	1	2	1
Evidence of pleural effusion and pulmonary tuberculosis in past, markedly thickened pleura (x-ray)	—	3	—

ent diagnosis appeared to confirm the absence of a tuberculous infection in these patients. Nevertheless, these patients are being closely observed. However, the biopsy findings of the parietal pleura were nonspecific in 5 patients (table 2) in whom the diagnosis of tuberculosis was proved by subsequent bacteriologic examination of the sputum (2 cases), pleural fluid (1 case), and lymph-node biopsy (2 cases). Two of these patients proved to have disseminated lymphohematogenous tuberculosis and only a transitory bilateral pleural effusion; 3 patients were known to have had a tuberculous pleural effusion in the past and showed roentgenologic evidence of pulmonary involvement and markedly thickened pleura. It is conceivable that, in those patients, decortication and surgical biopsy would have revealed caseation and granulomas in an area which the needle could not reach. These differences in the clinical picture between the patients with positive and negative biopsies are interesting, but the number of patients is too small for any valid conclusion regarding the pathogenetic implications.

Malignant involvement of the pleura was found in 8 patients. Bronchogenic carcinoma (figure 5) was found in 4 of these patients; adenocarcinoma of unknown origin in 2; lymphomatous involvement of the chest wall in 1 (figure 6); and mesothelioma in 1.

It is of interest that, in 3 patients with neoplastic disease of the pleura, needle biopsy was the only method which led to a cytologic diagnosis; the cell block obtained from the fluid contained

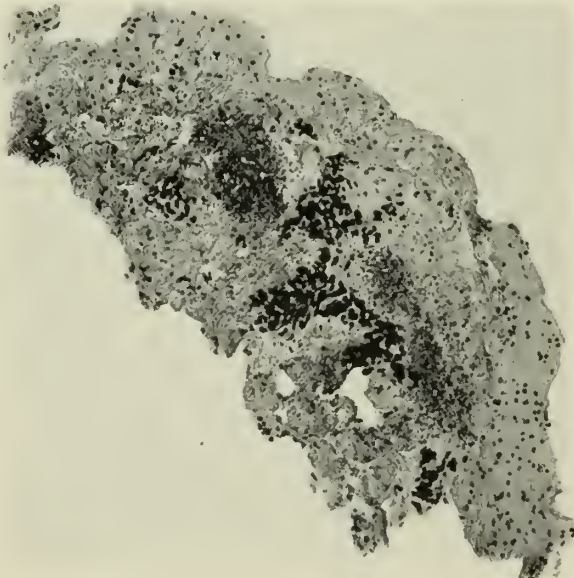


Fig. 5. Needle biopsy of the pleura showing nests of metastatic small-cell carcinoma.

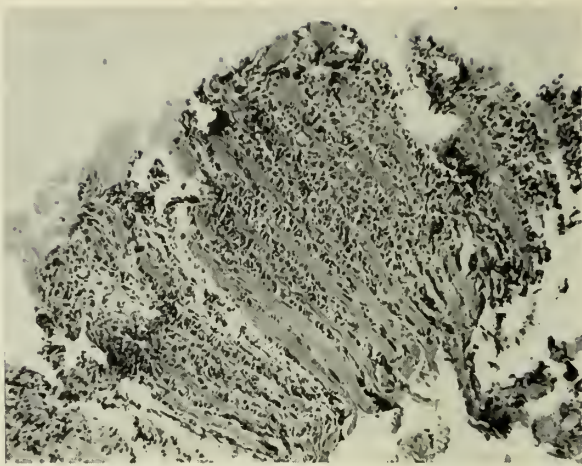


Fig. 6. Needle biopsy of the pleura. Sarcomatous infiltration of chest wall (100x enlarged).

only atypical cells. In the remaining 5, the examination of the fluid readily revealed evidence of a malignant tumor, while the biopsy was positive in only 3 patients at the first attempt. In 2 others, the second biopsy was positive. From these facts, it can be concluded that pleural effusion due to malignant neoplasm may be present without metastases to the parietal pleura, or there may be only small, patchy metastatic deposits which leave wide areas of uninvolved pleura between them. This was actually observed in 5 patients at autopsy (table 3). Severe hilar involvement was present, but no specific pathologic change along the parietal pleura was found. One patient with lymphosarcoma has had a stable chylous effusion for two years after the biopsy. In 2, the pleural fluid has not reaccumulated.

The usually assumed diagnostic and prognostic uncertainty of the nosologic entity, idiopathic pleural effusion, is reflected in the fact that 11 patients in this study, whose biopsy revealed only nonspecific inflammation or fibrosis, did have active tuberculosis or malignant disease (table 4). Nevertheless, while the true diagnosis was made in these 11 patients after a few weeks of observation, virtually certain evidence devel-

TABLE 3
MALIGNANT NEOPLASM (16 PATIENTS)
POSITIVE BIOPSY 8 NEGATIVE BIOPSY 8
ANALYSIS OF 8 NEGATIVE BIOPSIES

	Nonspecific	Insufficient specimen
Pleura uninvolved at surgery or autopsy	4	
Recurrent chylous effusion	1	
Single pleural metastasis at autopsy		1
Recent chylous effusion		1
Bronchogenic carcinoma with pleural fibrosis	1	

TABLE 4
FINAL DIAGNOSIS OF 28 PATIENTS WITH
NONSPECIFIC PLEURAL BIOPSIES

Tuberculosis	5
Bronchogenic carcinoma	3
Malignant lymphoma	3
Acute disseminated lupus erythematosus	1
Mitral stenosis	3
Congestive heart failure	2
Pulmonary infarct	1
Pneumonia	5
Trauma	2
Uncertain	3

oped that 14 other patients were not suffering from tuberculosis or malignant neoplasm (table 4), although, in some cases, several months of uncertainty and anxiety about the diagnosis had elapsed. Three patients had mitral stenosis with repeatedly recurring pleural effusion despite apparent absence of failure or rheumatic activity. In 1 patient, the effusion has not recurred following commissurotomy. The second patient died, and no abnormality of the pleura was found at autopsy. In the third patient, a tumor was suspected because of the large left auricle.

The patients with a postpneumonic pleural effusion are of special interest. They were older patients in whom pneumonia itself had produced only mild symptoms, while the major illness was the pleural effusion, which aroused the suspicion of the presence of malignant disease. The biopsy of such a patient, showing polymorphonuclear leukocytes overlying the intercostal muscle, is reproduced in figure 7. In view of the final uneventful recovery of these patients, the pleural biopsy was considered representative of the clinical picture, but the need for further close observations of such patients should be stressed.

There are only 3 patients with still undecided diagnoses. One patient had a pleural and pericardial effusion which was suspected of being tuberculous, but needle biopsy of the pleura, surgical biopsy of the pericardium, and all bac-

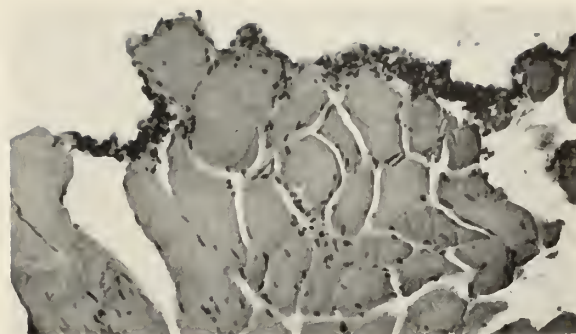


Fig. 7. Needle biopsy of the parietal pleura. Polymorphonuclear leukocytes overlying the intercostal muscle.

teriologic studies have not confirmed this suspicion. Although the patient has been asymptomatic for eighteen months, he is still being closely observed. Also, in the other 2, evidence points away from tuberculosis or malignant disease.

CONCLUSIONS

1. Needle biopsy of the parietal pleura is indicated whenever, according to clinical judgment, histologic diagnosis is needed or desirable.
2. This procedure by no means replaces the traditional technics, but it should be regarded as an additional diagnostic tool which may accelerate and facilitate the diagnosis.
3. It may be repeated or be followed by a surgical approach if, after a negative or unsatisfactory biopsy, a serious disease is still suspected.

Addendum. Since completion of this manuscript, 15 more patients with pleural effusion were subjected to pleural biopsy with a Vim-Silverman needle. Caseating granuloma was found in 2 patients and malignant neoplasm in 3. It is of interest that the Ziehl-Neelsen stain of 1 biopsy revealed acid-fast organisms.

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The Diabetic Patient with Tuberculosis

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THE COEXISTENCE of diabetes mellitus and tuberculosis has long been recognized as a serious public health problem. Pulmonary tuberculosis occurs 2 to 4 times more frequently among those with diabetes than in the cross section of the general population. In addition, according to Root,¹ tuberculosis is second only to cardiovascular disease as an eventual cause of death in juvenile diabetes, and, until recently, deaths among diabetics have been caused directly by tuberculosis in from 3 to 4 per cent of the cases. In 1952, Joslin² reported that among 656 diabetics who had died within the past two years, 0.9 per cent died with tuberculosis. It is well known that diabetes was a fatal disease a little more than a generation ago when it occurred in severe form, and when one thinks of how half of the diabetics at the beginning of the century died with tuberculosis, this latest figure is indeed more than encouraging.^{2,3} Today, the patient with diabetes, no matter how severe the disease and even when complicated by tuberculosis, possesses a tremendously better life expectancy, if the disease is discovered early and controlled adequately. In general, tuberculosis results to a large extent from neglected and inadequate treatment of the diabetic patient. In addition, the public has received little education regarding diabetes and the fact that tuberculosis is an unusually frequent complication of it. It has been estimated that there are perhaps 2,000,000 diabetics in this country and that one-half of these have not as yet been discovered!⁴ It is further estimated that diabetes develops in 100,000 individuals each year in the United States. The mortality rate for diabetes in 1953 per 100,000 population was 16.3.⁵ This is a public health problem of greatest magnitude. However, it presents one of the best opportunities for preventive medicine to come to the fore to seek out and discover these estimated million cases of diabetes and, through control measures, help to prevent the serious complications of diabetes, including

tuberculosis and early death, which will otherwise surely occur.

INCIDENCE AND MORTALITY

From a rather large amount of statistical data published by various authors, chiefly in this country, on the incidence of diabetes and tuberculosis, there has been a wide difference in their reports. Whereas an incidence of 1 per cent was found by Wilder and Adams⁶ in 1929, an incidence of 14.2 per cent was reported by Wiener and Kavee⁷ in 1944 at the Montefiore Hospital in New York. The explanation for their high incidence is without doubt due to the special interest in diabetes in this tuberculosis hospital and by the fact that practically all of its patients are Jewish. Generally speaking, variations in incidence depend upon the time and place the study was made, the socioeconomic conditions prevailing in the groups studied, age, sex, race, the thoroughness and size of the survey, and the educational program attending it.

In a very inclusive paper by Banyai and Cadden⁸ in 1944, the extensive reports to which they referred relative to the association of diabetes and tuberculosis showed a striking difference between European and American data. The statistics collected from the publications of 8 European authors between the years 1927 and 1938 and comprising 6,379 diabetic patients revealed the presence of pulmonary tuberculosis in 518 or an average of 8.1 per cent. The percentages varied from 4 to 16.5. Similar statistics collected from the publications of 10 American authors between 1927 and 1938 and comprising 16,950 diabetics revealed the presence of pulmonary tuberculosis in 486 or an average of 2.8 per cent. The percentages in this series varied between 1.0 and 9.3 and included the reports of Root, 2.5 per cent; Sosman and Steidl, 9.3 per cent; Golden, 4.6 per cent; Wilder and Adams, 1 per cent; Fritz, 2.3 per cent; Wendt and Peck, 3.9 per cent; Severinghaus, 1.6 per cent; Murphy and Moxon, 4.8 per cent; Kramer and Lawson, 1.2 per cent; and Rolli and Steinberg, 4.3 per cent.

In a more recent study by Boucot and associates,⁹ published in 1952, the clinical data from

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the Philadelphia survey were reported. In this study, 3,106 diabetic patients from 22 hospital clinics and 94 private physicians had their chests surveyed by photofluorograms, and 8.4 per cent were found to have pulmonary tuberculosis. This compared to a percentage of 4.3 in an otherwise healthy industrial group corresponding in age, sex, and race. The Philadelphia survey reported that 14 per cent of their diabetics with evidence of tuberculosis were under age 40. In this group, 5.3 per cent showed active disease, whereas of those over 40 years of age, only 1.7 per cent showed evidence of active disease. The highest incidence of active disease was found in the group under 40 and in those of this group who were taking more than 40 units of insulin daily. Of these, 8.8 per cent had active tuberculosis, whereas only 2.6 per cent of the entire 3,106 diabetics surveyed were found to have active disease. Of the 3,106 diabetics, 70 per cent were women. In the younger age group, it was also found that the prevalence of tuberculosis was greater in those who had had diabetes longer than ten years and in those who were underweight. Root¹ has pointed out that tuberculosis in those of high school age occurs 12 times more frequently than it does in nondiabetics of the same age group. The Philadelphia survey, in addition, revealed that the prevalence of tuberculosis among white diabetics was almost 10 per cent, whereas in Negroes, it was only 4.3 per cent. The authors believed that these differences were probably due to a much higher death rate for Negro diabetics with tuberculosis than for whites. This coincides with the view of Joslin¹⁰ who found in 1940 that the death rates for Negroes under 55 years of age were higher than those for whites. Root and Bloor¹¹ found that 17.8 per cent of their patients who were admitted in coma had evidence of active tuberculosis within five years, and Joslin¹ reported that 12.5 per cent of 159 patients recovering from coma died eventually of tuberculosis. The latest overall death rate of diabetic patients dying of tuberculosis reported by Joslin² in 1952² was only 0.9 per cent. As commented upon before in this paper, this is truly a remarkable figure and it is indeed encouraging.

According to Root,¹ the incidence of diabetes in tuberculosis hospitals is increasing. In Massachusetts, whereas 1 person in 200 to 250 had diabetes in 1931, 0.7 per cent of the sanatorium population had diabetes. In 1952, the rate had risen to 1.3 per cent in 4 of the state sanatoria in Massachusetts. Out of 3,178 patients admitted to Uncas on Thames Hospital from 1937 to 1950, 68 or 2.1 per cent had diabetes. According to

Boucot, about 4 per cent of the tuberculosis patients at the Philadelphia General Hospital have associated diabetes. In 1931, Banyai reported a percentage of 0.7 from the Muirdale Sanatorium, and in 1944 it had risen to 1.6 per cent. In a discussion of a paper presented by A. Reand of Havana at a meeting of the Southern Medical Association in 1953, E. R. Smith¹² reported the percentage of diabetics in our Florida tuberculosis hospitals to be 2.7. At the time this report was made, there were 43 cases of diabetes in the 4 tuberculosis hospitals, according to Dr. Smith. A more recent review of the diabetics in our 4 tuberculosis hospitals made in August 1956 reveals 55 cases among the total population of 1,511, or a percentage of 3.6, almost 1 per cent higher than that found in 1953. Practically all of these patients were found to be in the advanced stage of the disease. Of the 55 diabetic patients, 29 were Negroes and 26 were whites. Thirty-three were females, 24 of whom were Negroes, and 22 were males, of whom 17 were white. All but 11 of the 55 diabetics were over 40 years of age.

PATHOGENESIS

I have previously discussed the pathogenesis of pulmonary tuberculosis.¹³ To my way of thinking, this is one of the most fascinating subjects in medical literature. Tuberculous infection, almost universal a few decades ago, now occurs in about 50 per cent of the population of this country, whereas tuberculous disease is found in less than 0.5 per cent of our general population. We must conclude, therefore, that the susceptibility to tuberculous infection is fairly general and is primarily dependent upon contact with the tubercle bacillus, whereas the development of tuberculous disease is individual and dependent on various factors which may be included under the one term, resistance, sometimes most difficult to evaluate. In addition to other possible causative factors which will not be presented here, a new factor which has been discussed widely in recent years is that of *stress*. King¹⁴ has mentioned 5 conditions which seem to have a direct bearing on the development of tuberculous disease: starvation, gastric resection, puberty, diabetes, and the administration of cortisone. Certainly, stress is a common factor in these conditions. Morgan and associates¹⁵ have demonstrated that the administration of cortisone causes a deterioration of tuberculosis in both sensitive and nonsensitive rabbits, leading to rapid death with extensive fulminating disease. A number of reports on the use of cortisone in human tuberculosis show that it must be used extremely

carefully, under cover of drugs, and in the presence of sensitive organisms if spreads of the disease are not to occur. Cortisone has pronounced anti-inflammatory activity. However, it depresses resistance and may result in dissemination because it gets rid of inflammatory walls. Its administration has been shown to inhibit the formation of granulation tissue, to depress macrophage activity, to deplete lymphoid tissue, and to reduce the function of the reticuloendothelial system. All of these factors are very important in the response of the individual to his disease.

Two recent studies, one by Thompson and Watson¹⁶ and the other by Steinberg and Wilder,¹⁷ lend support to the conclusions of Pincus and White¹⁸ that predisposition to diabetes in the great majority of pedigrees is a simple mendelian recessive. Nevertheless, whatever the pathogenesis of diabetes, it is reasonable to theorize that the mechanism of the reactivation of pulmonary tuberculosis and that of diabetes may indeed be very similar. Increased secretion of corticosteroids in the urine in ketosis suggests that repeated periods of cortisone production may occur with subsequent impairment of resistance to tuberculosis. It has been pointed out by Friedgood¹⁹ that it is perhaps the minority opinion today that the onset of diabetes, including obesity, occurs in a setting of long-continued social and emotional stress. These investigators also reveal that diabetic patients who are subjected to emotionally frustrating situations develop hyperglycemic reactions, increased glycosuria, ketonuria, and polyuria, all of which are ameliorated on removal of the stress. Forsham and Thorn²⁰ state that the antiinsulin effect of the stress reaction may overwhelm any inadequate islet cell reserve and produce diabetes. We may conclude that the pouring out of cortisone, therefore, may be a vital factor in the initiating cause of diabetes²¹ and also of an increased susceptibility to tuberculosis.

TREATMENT

The successful treatment of the diabetic patient with tuberculosis depends upon control of the diabetes by means of diet and insulin and control of the tuberculosis by hospitalization and coverage with the modern antituberculosis drugs until the disease has been arrested. It is a relatively simple matter to obtain good regulation in most diabetic patients provided the patients cooperate. However, control is often impossible to obtain with any regimen until a patient under emotional stress, having wide swings from hyperglycemia to hypoglycemia, has had proper psychologic care.

We fully realize that nowhere has the problem of education of the adult, as well as the juvenile, diabetic with tuberculosis been successfully met as far as the proper attitude toward both his diabetes and his tuberculosis is concerned. This phase of treatment and the doctor-patient relationship, in many instances, may be as important as the actual physical treatment of the patient. Beaser²³ believes it should be an integral part of the minimum standards of hospital treatment for diabetes. Such minimum standards are equally important as far as pulmonary tuberculosis is concerned. Under these conditions, much better cooperation of the patient may be obtained and, perhaps, emotional upsets may be averted. Without the psychologic treatment of both the diabetic and the tuberculous patient, good cooperation and control of the disease may not be expected in many instances.

At the moment, the conservative view of rather strict aglycosuria and normoglycemia appears to prevail as far as the tuberculous diabetic patient is concerned. However, a diet that is adjustable to meet the variables in the patient's everyday life is of basic importance, and the correct weight of the patient should be maintained. The daily intake of vitamin A should be around 25,000 units and that of vitamin C around 300 mg.

Specific therapy for tuberculosis includes rest, adequate diet to maintain the patient's weight, psychologic treatment, and coverage with antibiotics and chemotherapeutic agents and surgery. Most surgical measures, with the exception of excision surgery, are being relegated to the past. Tuberculosis in diabetics responds beautifully to drug therapy provided the diabetes is controlled. Isoniazid and PAS are the drugs of choice and our patients are routinely placed on this combination at the time of admission. The most important early objective is to stabilize the tuberculosis by clearing the acute lesions, by closing cavities, and by converting the sputum to negative. In patients in whom the organisms persist and resistance to isoniazid develops, streptomycin is substituted for isoniazid and, in many instances, with successful results. Sensitivity studies should be made on all positive cultures to determine resistance of the organisms to the drugs. Whenever an allergic response to any drug develops, another may be substituted. When the disease has become stable and when surgical excision is indicated, these patients have been found to respond extremely well to such treatment. Present day postoperative mortality in diabetics with tuberculosis is practically the same as that for tuberculosis alone. The usual safeguards for patients in general undergoing

surgery are carried out for diabetics. The long-term results in all clinics everywhere, including our own, give reason to believe that this type of surgery performed in properly selected cases provides the best hope for permanent arrest in the tuberculous diabetic patient than any treatment previously instituted. Prolonged combined drug therapy for two years is now generally recognized as essential for a successful outcome. Even longer periods of therapy may be indicated in selected cases. "Current Concepts of Drug Therapy in Pulmonary Tuberculosis," by Brock,²⁸ was published in the October 1956 issue of the *Journal of the Florida Academy of General Practice*.

PREVENTION AND PROGNOSIS

In attempting to estimate how many patients with diabetes will develop tuberculosis as a complication in the future, we must consider the changing death rates for the two diseases, the changing life expectancy, the case rates for tuberculosis, the effectiveness and number of case-finding programs for both diseases, and the socioeconomic conditions of the various groups under consideration. Although the death rate for tuberculosis has declined precipitously to 10 per 100,000 population in 1954, the morbidity rates are still high and have declined only slightly in comparison. Between 1947 and 1953, the decline in the death rate from tuberculosis in 30 different countries, including the United States, was 60 per cent. The case rate per 100,000 population in 1954, however, was 48.8 for all ages and races, or 40.1 for whites and 119.1 for Negroes. For the older age groups, 45 to 64 and 65 and over, the case rates were 76.5 and 85.4, respectively.²⁹ It is readily seen that since the duration of life of diabetics has increased in recent years in all age groups from 4.9 years in the preinsulin years to about 20 years at the present time, there is a greater opportunity for contact with active cases of tuberculosis and development of the disease.

It has been frequently stated in the literature that the patient with diabetes when discovered early and controlled adequately possesses an almost normal life expectancy. Unfortunately, the use of case-finding programs and the more refined tests for the discovery of the unknown diabetic have been neglected, so that adequate control has not been attained. Reliance on the fasting urine specimen for screening purposes is too common considering the fact that many cases will be missed without a blood sugar test. More surveys similar to the one conducted in Florida in the summer of 1952 and referred to

by Smith¹² should be made if the estimated 1,000,000 unknown diabetics in this country are to be found. In the Florida survey, 10,844 individuals were examined both for tuberculosis and diabetes. In the examination for diabetes, venous blood was used for the determination of glucose. The results of the study revealed that 174 individuals might have had previously undetected diabetes. Six cases of active pulmonary tuberculosis and 104 suspects were uncovered. During the survey, 209 known diabetics had 70 mm. chest roentgenograms made and tuberculosis was not found in any of them. Beaser²³ refers to a very refined method of combining steroids stress with the glucose load which might be used particularly on siblings of diabetic persons who are suspected of having diabetes. In such cases or in cases in apparent remission, cortisone or ACTH might cause persistence of impaired glucose tolerance.

By way of prevention, it is also most important to set up a schedule for x-raying the chests of known diabetics and examining the blood of known tuberculous patients. It is agreed by all that known diabetics should be x-rayed at least every six months if possible. Any diabetic who has a loss of weight which cannot be readily explained or in whom pulmonary symptoms have developed should have a chest roentgenogram made. A patient whose diabetes cannot be controlled and is not doing well or who becomes febrile certainly deserves a roentgenogram. A diabetic who has been exposed to a case of active pulmonary tuberculosis for a reasonable period of time should be followed closely by x-ray. All juvenile diabetics should be tuberculin tested regularly and when the test becomes positive a chest roentgenogram should be made. Education of the patient and his constant supervision by the physicians are important factors in prevention. It cannot be stressed too strongly that early diagnosis is essential and that a delay in diagnosing diabetes usually means advanced disease with caseation, cavitation, and early death. The control of diabetes is also essential, since most authorities state that the patient whose diabetes is controlled handles his tuberculosis well provided the tuberculosis is also adequately treated. It is also important for the discharged arrested patient with diabetes to be followed closely, for his relapse rate is believed to be no worse than that of the nondiabetic provided the diabetes is well controlled.

In conclusion, it may be stated that at no time in history are we better prepared to find the diabetic early, control his disease, and prevent the otherwise dreaded complications and early death

than we are today, and never before have we had better facilities for discovering tuberculosis.

Let us use these facilities to best advantage in the future!

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MUCORMYCOSIS, an infection caused by fungi such as *Rhizopus* that are not ordinarily pathogenic to human beings, usually affects the cerebrum or the lungs but may involve the eyes or the intestine. Rarely, disease is disseminated. This condition is occurring with increasing frequency, probably because of widespread use of antibiotics, which control bacterial infection but are not effective against fungi.

Usually, mucormycosis occurs as a complication of leukemia or uncontrolled diabetes. Multiple myeloma, severe burns, cirrhosis, and medication with anti-leukemic drugs, antibiotics, or cortisone may also predispose to fungous infection.

The fungus enters the body through the nose. Sinusitis, orbital cellulitis, meningoencephalitis, thrombosis of the ophthalmic and internal carotid arteries, and cerebral softening may ensue in susceptible individuals, or the organism may invade the bronchi, producing pulmonary thrombosis and infarcts and bronchopneumonia. The fungus spreads along the arteries, penetrating the muscular walls and proliferating within the vessels; purulent arteritis or thrombosis often results. Veins and lymphatic vessels are affected later.

Diagnosis depends upon recognition of the fungus in specimens of tissue or body fluids. The lesions show broad, branching, predominantly nonseptate hyphae. Arteries and veins are involved and may be thrombosed.

Pulmonary mucormycosis is often abrupt in onset. Both pulmonary and cerebral mucormycosis are often rapidly progressive, causing death within one month. Treatment consists of correction of the predisposing condition. Desensitization to autogenous vaccine and subsequent iodine therapy may be beneficial. No chemotherapeutic agent effective against *Rhizopus* organisms is now available.

ROGER D. BAKER, M.D., Duke University, Durham, North Carolina: *J.A.M.A.* 163:805-808, 1957.

Current Status of Spinal Traction

EUGENE NEUWIRTH, M.D.

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THE HISTORY OF SPINAL TRACTION dates from antiquity. Data referring to spinal traction (vertebral elongation) occur in the writings of Hippocrates, 460–357 B.C.; Galen, 130–210 A.D.; Oribasius, 325–403 A.D.; Rhazes, 850–932; Avicenna, 980–1037; Ambroise Paré, 1510–1590; and others. In the past, spinal traction and manipulation served to correct deformities of the trunk caused by abnormal curvatures of the spine.

Currently, spinal traction is used chiefly in attempts to influence the intervertebral disk.¹ A pathologic disk may give rise to annular protrusion, nuclear herniation, osteoarthritic proliferations, and vertebral displacements. Such structural changes may, by friction and compression, irritate a wide variety of spinoneural structures and surrounding soft tissues, causing widespread pain. Most commonly affected are the spinal cord, the ventral and dorsal nerve roots, and the vertebral nerve.² Also affected are the meninges, ligaments, blood vessels, and lymphatics.

To minimize or remove the pressure of vertebral lesions upon the spinoneural and other structures, tables for the application of controlled spinal traction are effectively employed (figures 1, 2, 3, and 4). Present-day tables are the result of contributions made over centuries. In our time, Caruette and Terray,³ de Sambucy,⁴ and de Sèze and Levernieux⁵ sparked the new interest in the construction and use of traction tables.

OBJECTIVES OF SPINAL TRACTION

The objectives of spinal traction are:

1. To eliminate the effect of gravitational forces, which, in the standing position, exert centrifugal pressure upon the disk.

2. To widen the interspace. This goes hand in hand with stretching the intervertebral disk and creating negative pressure inside the interspace so that suction is produced, which may aid the displaced disk to regain its normal anatomic site.

3. To enlarge the intervertebral foramina, and, thus, reduce the pressure exerted upon their contents. In disk disease, the intervertebral foramina are frequently constricted and deformed, causing strangulation of the foraminal nerves, arteries, veins, and lymphatics.

4. To straighten out the nerve root and promote its relocation in relation to the protruded disk, which provides relief from pressure.

5. To stretch the posterior longitudinal ligament taut and, thus, push the protruded disk inward away from the nervous structures.

6. Finally, to reduce subluxated apophyseal joints and displaced vertebrae.

To achieve these objectives, the tractive pull must be sufficient to overcome the resistance offered by the fibrous, elastic, and muscular tissues which are linked to the vertebral column. Furthermore, to render traction effective, the same degree of pull must be applied to each end of a small segment of the spine. The principle of bipolar traction, based upon roentgenologic, experimental, myelographic, discographic, and nucleographic studies, particularly those of de Sèze and associates,⁵ governs the construction of the modern traction table (figures 1, 2, 3, and 4). Experimental studies⁶ seem to prove that current methods of constant weight traction applied to the legs or pelvis by means of a belt produce no stretch effect upon the lumbar spine.

APPARATUS AND EQUIPMENT

The traction table which we use is simple in construction (figures 1 and 2). It can be tilted on a central axis, head up and head down. At the foot of the table, 2 pulleys are mounted on a transverse axis. The head of the table carries a detachable steel frame allowing a set of pulleys to be placed at various levels of elevation. This arrangement permits the performance of cervical traction at varying degrees of neck flexion. For use in conjunction with the table are a headsling, a chest corset, and a pelvic belt.

TECHNIC

Cervical traction. The patient lies supine on the table with the headsling applied to the chin and occiput. The straps of the headsling hold spring

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Fig. 1. Cervical traction by means of the Godet-Neurwirth traction table.

scales and run over the pulleys, which are mounted at the table end. The table is slowly raised at the head, thus permitting the patient to slide forward and downward. The amount of pull used, ranging up to 70 lb., is indicated on the scales (figure 1).

Lumbar traction. The patient lies on the table either in the supine or prone position, whichever is best tolerated. In either position, the corset and pelvic belt, which have previously been adjusted in the standing position, are drawn tight, and their straps are pulled taut at either end of the table. In this manner, distraction of the vertebrae is produced in the lumbar segment (figure 2). Efficient traction in this region requires 150 to 250 lb. Figure 3 illustrates the Levernieux method of lumbar traction.

Thoracic traction. This type of traction is performed by combining pelvic traction with cervical traction. About 110 lb. of tractive force is necessary in these cases.

INDICATIONS FOR SPINAL TRACTION

Indications for cervical traction. The following conditions of cervicovertebral origin are frequently benefited by cervical traction: acute neck pain (torticollis); cervicobrachial neuralgia (radiculargia); lower motor neuron syndrome; acroparesthesia; "intricated" and pseudoangina; ocular lesions of cervical origin;⁷ headaches; facial, neck, chest wall, shoulder, and scapular pains;⁷ and the posterior cervical sympathetic syndrome.²

Indications for thoracic traction. Thoracic in-



Fig. 2. Lumbar traction by means of the Godet-Neurwirth traction table.

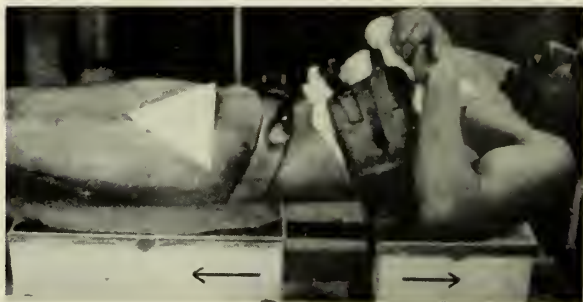


Fig. 3. Levernieux method of lumbar traction. Pelvis and chest are strapped to blocks which are moved in opposite directions.



Fig. 4. Table for the simultaneous application of spinal rotation and traction (Dr. Carrère).

tervertebral disk protrusion and thoracic spondylosis are important indications for traction. Symptoms and signs develop which indicate the level of the thoracic lesion and its position in relation to the spinoneural structures. The patient complains of high backache and/or of pain radiating down the inner aspect of the upper extremity (involvement of the first thoracic spinal root) or is disturbed by severe pain in the intercostal space, abdomen, or groin. Movement of the spine, deep breathing, and coughing aggravate the pain, and when it is accompanied by a

spastic-ataxic gait, impairment of the pyramidal and spinocerebellar pathways may be suspected.

The possibility of pathologic changes in the thoracic spine may be overlooked and confused with manifestations of chest or abdominal disease. In similar situations, patients sometimes have been subjected to unnecessary surgical procedures.⁸

Indications for lumbar traction. Lumbar intervertebral disk protrusion is the most important indication for heavy lumbar traction. It occurs most frequently at levels L5-S1 and L4-L5, where it can cause compression of the first sacral or the fifth lumbar nerve root. Common clinical features of lumbar disk protrusion are low back and sciatic pain, sensory deficit in the first sacral or the fifth lumbar dermatome, sluggish or absent ankle reflex, and weakness and wasting of the muscles supplied by the affected nerve root. The patient walks with a limp and to decrease or avoid pain exhibits protective mechanisms, such as scoliosis of the lumbar spine, restricted motion in the low back, and limited straight-leg-raising (Lasègue test).

The Lasègue test evaluates the degree of decrease in the amount of pressure exerted upon the nerve root and permits the examiner to assess the progress of improvement after the use of spinal traction.

Seventy-five per cent of cases of lumbar disk protrusion respond favorably to traction. Some writers claim^{9,10} that only pulpy or nuclear herniation is effectively reduced by spinal traction and that manipulation is the proper method to use to achieve reduction of a displaced annular fragment.

Lumbar traction is also indicated in cases of osteoarthritis of the lumbosacral spine and instances of lumbar disks not wholly degenerated, spondylolisthesis, and sacroiliac arthritis.

It should be borne in mind that a normal roentgenogram of the lumbosacral spine does not necessarily rule out disk disease as the source of low back and sciatic pain. In order to demonstrate the presence of disk disease in such a case, myelographic and diskographic studies may be necessary.

In the absence of organic findings, emotional or mental disturbances must be considered possible causes of low back pain. Such disturbances may also aggravate pain of somatic origin. All superimposed psychogenic factors should be resolved if successful results are to be achieved.

In low back pain arising from static errors, for example, scoliosis, hyperlordosis, and so forth, spinal traction is used only to supplement the proper measures.

CONTRAINDICATIONS

Spinal traction is contraindicated in the following conditions: anomalies of the central nervous system, such as meningocele, syringomyelocele, and so on; tumors of the spinal cord, the nerve roots and their investments; advanced pressure atrophy of the nerve root; neoplasms of the vertebrae; infections, such as vertebral brucellosis, tuberculosis, and osteomyelitis other than tuberculous; rheumatoid (ankylosing) spondylitis; tears of muscles and ligaments; and fractures and gross dislocations of vertebrae.

In the presence of hepatitis, severe cardiac disease, advanced arteriosclerosis, and extreme degrees of hypertension, spinal traction is best omitted.

Spinal traction is not a dangerous procedure if preceded by a thorough physical and roentgenologic examination. If, after starting traction, pain increases, traction therapy should be abandoned. Occasionally, painful spasm develops in the back muscles upon sudden termination of traction. In order to avoid this disagreeable occurrence, the tractive pull should be gradually released.

RESULTS OF TREATMENT

Heavy spinal traction is definitely effective in many spondylogenic syndromes. When administered correctly to patients who have been adequately examined and evaluated, traction often pays a quick and rich reward. In general, experience has been that spinal traction performed as outlined has benefited a high percentage of cases hitherto unsuccessfully treated with a wide variety of measures and over long periods of time. In my experience, 75 per cent of patients with syndromes of vertebral origin in the cervical or lumbar region have recovered completely or have attained substantial relief from pain. The recovery of 80 to 90 per cent of patients presenting a psychologic as well as a physical problem is attributed by Frazer¹¹ to the employment of a comprehensive treatment in which traction played the leading role. Cyriax¹⁰ states that the introduction of traction in 1950 reduced the laminectomy rate in his patients for all disk lesions from 1:40 to 1:200. My own experience with heavy spinal traction lends support to the view that surgery should be performed only in patients in whom a thorough trial with traction has failed.

SUMMARY

The mode of action of heavy spinal traction is explained, and the apparatus and technic are described.

The principal objectives of spinal traction are discussed, and indications as well as contraindication for such therapy are presented.

The importance of resolving psychologic problems is pointed out.

The therapeutic results are reported.

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A LESION OF A PLANTAR DIGITAL NERVE, usually the fourth, is apparently the cause of Morton's metatarsalgia, notable by neuralgic pain beneath the head of the third or fourth metatarsal bone after excessive standing or walking. Histologic examination of the so-called neuroma shows degeneration, fibrosis, and increased vascularization but no neoplastic growth.

Trauma from ill-fitting or high-heeled shoes or from weightbearing probably initiates the neural change. Stretching of or pressure upon the nerve may produce vasospasm. The resultant ischemia damages the nerve. As irritation continues, the lumens of the digital artery and the intrafascicular arterioles become narrowed, further reducing blood supply and intensifying neural alterations.

Often, neuralgic pain is relieved by removal of the shoe. Occasionally, a mass is palpable between the third and fourth metatarsal bones, and firm deep pressure over the affected area may reproduce the pain. An area of localized tenderness extending from the sole into one of the digits may be noted. Paresthesia or anesthesia of the adjacent toes may also be observed. Rarely, the roentgenogram shows separation of the metatarsal bones. No inflammation is evident.

Surgical removal of the affected portion of the plantar digital nerve is curative. Special shoes or arch supports provide only temporary relief.

THOMAS M. SCOTT, M.D., University of Miami, Coral Gables, Florida. Arch. Path. 63:91-102, 1957.

American College Health Association News . . .

We wish to extend a hearty welcome to the following new members whose applications for membership have been approved by the Executive Committee and who were formally approved by vote of the membership at the thirty-fifth annual meeting in Baltimore:

Brigham Young University, Provo Utah. Representative: Allan H. Barker, M.D.

Florida Agricultural and Mechanical University, Tallahassee, Florida. Representative: Russell L. Anderson, M.D., director of Student Health. Alternate: Grayce E. Smith, R.N., supervisor, Student Health.

Hampden-Sydney College, Hampden Sydney, Virginia. Representative: Ray A. Moore, M.D., college physician.

Hanover College, Hanover, Indiana. Representative: William Murray, M.D., psychiatric consultant.

Agricultural and Mechanical College of Texas, College Station, Texas. Representative: Charles R. Lyons, M.D., director, Student Health Service. Alternate: Maxine Geeslin, R.N., nursing supervisor.

Tufts College, Medford Massachusetts. Representative: Clark W. Heath, M.D., director of Health Service. Alternate: John P. Tilton, Ed.D., vice-president and Provost.

* * *

The recent meeting of the American College Health Association in Baltimore, Maryland, was attended by 226 registrants. Highlight of the business sessions was the adoption of amendments to the Constitution and By-Laws concerning membership and dues in the organization. The changes are as follows:

MEMBERSHIP

Membership of the association shall be of two categories, institutional and individual, as described in the following paragraphs:

(a). *Active membership*—open to any degree-granting college or university of recognized standing, not conducted for financial gain or profit, interested in promoting student health and meeting the standards set up by the United States regional accrediting agencies. Each active institutional member shall appoint one person, preferably head of the department concerned with the college health program, who shall be the official voting representative of the member school and who shall be eligible to hold office. In the event that this representative may be unable to attend annual meetings, the school may authorize an alternate who shall substitute for and assume privileges of the institution's representative.

(b). *Associate membership*—open to any two-year or junior college that meets the standard set up by its regional accrediting agencies. Offers the privileges of attendance and participation at meetings of the association and of membership on Standing Committees but not of voting, holding office, or chairmanship of committees.

The institutional representative in paragraphs (a) and (b) may participate in but does not have the privilege of membership, voting, or holding office in any Section unless he is also a member of the Section and has paid his individual membership dues of \$5.00.

(c). *Individual membership*—open to anyone interested in college student health work whether or not affiliated with a college or university and, if so affiliated, whether or not the college or university is a member of the A.C.H.A. Offers membership in any Section of the association with voting and office-holding privileges in

the Section to which he belongs but not in the association. No member can belong to more than one Section. A member is not required to belong to any Section.

DUES

(a). *Active institutional membership* for colleges and universities shall be assessed annual dues as follows:

(1) Enrollment less than 2,000 students, \$20.

(2) Enrollment 2,000 to 5,000 students, \$30.

(3) Enrollment over 5,000 students, \$50.

When two or more educational institutions located in separate cities are under the administration of one governing body, each such institution will be considered a separate college for membership in this association.

(b). *Associate membership* — \$10 per year.

(c). *Individual membership* — \$5 per year.

SECTIONS

(a). The present Standing Committees of the association would become respectively: (1) Section on Health Education, (2) Section on Medical Services, (3) Section on Environmental Health and Safety, (4) Section on Administration, (5) Section on Research, and (6) Section on Tuberculosis Control.

(b). Two of the Special Committees would become: (7) Section on Mental Health, and (8) Section on Nursing Service.

The other Standing Committees and remaining special committee structure would remain unchanged.

Each Section would be responsible for developing and presenting its own program and initiate studies or resolutions to be presented to the Council of the association for consideration and recommendation or action.

Any expense to the association in the operation of the Section will be limited to printing of the Section Program in the program of the annual meeting. Requests for other expenditures can be made to the Council which must be approved before expenditures can be made or committed.

A new Section may be formed with the approval of the Council, provided 15 or more individuals who are not members of another Section desire to form a new Section. It is understood that the Board will not approve the formation of new Sections if the aims and objectives of the proposed Section can be included under an existing Section.

REGISTRATION FEE

Every person attending the annual meeting shall pay a registration fee of \$3.00 unless he is an institutional representative or an individual member having paid \$5.00 dues.

The above changes will go into effect on January 1, 1958.

The Council agreed also that associate members and individual members should receive a copy of the Proceedings of the Annual Meeting as do active members.

* * *

The following persons took office for 1957-1958 following the election on Saturday, April 27:

President, Carl Wise, M.D., Columbia University; president-elect, Lewis Barbato, M.D., University of Denver; vice-president, Paul O. Greeley, M.D., University of Southern California; and secretary-treasurer, John Summerskill, Ph.D., Cornell University.

Council: Thomas Urmy, M.D., Williams College, and Otto Keller, M.D., Illinois State Teachers College, DeKalb.

Comments concerning this Section, criticisms, or suggestions for papers will be most welcome. Physicians are cordially invited to submit articles pertaining to pain for consideration. All inquiries and manuscripts should be sent to Dr. John S. Lundy, 102 Second Avenue Southwest, Rochester, Minnesota, or to the Editorial Department, THE JOURNAL-LANCET, 84 South Tenth Street, Minneapolis, Minnesota.

The Dental Pain Mechanism

Part II. Physiologic Characteristics

JOSEPH A. GIBILISCO, D.D.S.

Rochester, Minnesota

SINCE THE TRIGEMINAL NERVE comprises the major sensory supply to the oral cavity and adjacent structures and since many clinical entities are possible within the trigeminal field, it frequently becomes advisable to obtain several clinical opinions in order to confirm a diagnosis. As a specialist nearly limited to this region, the dentist assumes two highly important responsibilities: (1) to be thoroughly acquainted with the complex pain variables of this area which involve the dental mechanism per se, and (2) to be cognizant of those symptoms of pain which may appear to have origin within the dental system but, in reality, require the analysis of other medical specialties.

The first of this series of three articles outlined additional objectives and, in part, the neuroanatomic characteristics which are fundamental to dentistry. This paper continues into the physiologic aspects which are equally fundamental.

Some investigators date the beginning of present neurophysiologic methods back a century and a half to Galvani and his followers who showed that living tissues give rise to electric current when they are injured or, more important, when they are active.¹ When a stimulus of any kind—mechanical, thermal, chemical, or electric—is applied to the nerve, the nerve is excited. This excitation travels along the nerve fiber accompanied by an electric effect, the action potential.²

Gasser and Erlanger³ were the first to demonstrate that the velocity with which the action

potential travels along the nerve differs according to the diameter of the fibers involved. They showed that a nerve is made up of fibers which have different conducting velocities. If a stimulus is applied to one point of a nerve trunk and recordings are taken from another distant point, a series of action potentials will be recorded because the fibers composing the nerve trunk will conduct the stimulus at different rates.

On the basis of such observations, nerve fibers have been classified into 3 groups: A, B, and C. In group A, fibers conduct at the fastest rate and include all myelinated axons of somatic nerves. They range in diameter from 20 μ to 1 μ and are subdivided into 4 subgroups labeled alpha, beta, gamma, and delta. Fibers of the B group conduct at a slower rate than the A group and are myelinated fibers of 3 μ or less in diameter found in the autonomic nerves. Fibers in group C are the slowest conducting, are unmyelinated, and are less than 1 μ in diameter.^{1,4} (table 1).

In some of my studies, after stimulation of trigeminal fibers of the teeth and gingiva, the gamma-delta fibers of group A were especially prominent. As can be noted from the table, these fibers are from 1 to 8 μ in diameter and conduct pain and temperature impulses at a velocity of 5 to 40 meters per second between the point of stimulus (maxillary cuspid) to the point of recording (gasserian ganglion).

The unusual qualities of dental pain have been well investigated by physiologists interested in the over-all pain problem. In his monograph on sensory perception, Adrian⁵ expressed his con-

TABLE 1
PROPERTIES OF MAMMALIAN NERVE FIBERS
(Modified from Grundfest)

Group and type	Diameter, microns	Velocity, meter per second	Afferent fibers	Efferent fibers
A1 Alpha	20-12	120-80	Proprioceptive activity	To skeletal muscle
A2 Beta	12-8	80-40	Touch and pressure	None
A3 Gamma	8-1	40-5	Pain, warmth, and cold	Intrafusal fibers of skeletal muscles
A4 Delta				
B	3	15-3	None	Autonomic preganglionic
C	1	2-0.5	Visceral: afferent pain and temperature	Autonomic postganglionic

cern with the limited information on the mechanism of pain, because pain is capable of reaching a far greater intensity than any other sensation. He suggested that the difficulties of studying pain may be due to the small diameter and, consequently, small electric disturbance in the nerve fibers involved. The action potentials of the pain fibers are mostly obscured by the sizable responses of the larger fibers, such as touch and pressure. As an example, Adrian⁵ cited man's strong subjective awareness of the familiar toothache, yet, in objective laboratory tests, only a slight irregularity is observed on the electric record after the pulp has been stimulated.

Pfaffmann⁶ conducted studies from which he made some of the early observations following pressure stimulation of the maxillary teeth and periodontal membrane. The recording electrode was placed on the maxillary nerve fibers. He noticed that the response of the teeth to pressure or touch stimulation diminished little even though the pulp and apical canal nerves were removed from the teeth. This suggested the possibility that the specialized endings responsive to pressure or touch stimulation are located in the periodontal membrane. He also determined that the fibers of the periodontal membrane have a greater conduction velocity than the fibers of the pulp.

Corbin and Harrison's⁷ studies on the function of the mesencephalic root of the fifth nerve have helped remove some of the confusion surrounding the purpose of these fibers. They have shown that regardless of other functions that may be associated with this root, its fibers mediate proprioceptive activity from the muscles of mastication and deep pressure impulses from the teeth (periodontal membrane). In addition, the proprioceptive activity of the muscles of mastication plus the "pressure sense" of the dental soft tissues combine to coordinate the movements of the lower jaw and allow for control over the

forces at work in mastication. This work has had a direct clinical application in the diagnosis of dental pain problems, primarily in the correction of some of the problems of pain in the temporomandibular joint, at least those attributed to unbalance of dental occlusion. Periodontists and prosthodontists have also utilized these data to further their experimental methods as well as to better their clinical judgment.

Yamada and associates,⁸ investigating the hypersensitivity of dentin, have recorded electric afferent impulses from the mandibular branch of the trigeminal nerve at the root apex. Both mechanical (hot air jet and cold water) and electric stimuli were applied to the dentinal tissue. Stimulation of the dentin resulted in curious "spontaneous discharges," not like the high electric activity resulting from the dentino-enamel junction, predentin, or pulp. No typical action potentials were observed as a result of dentinal stimulation. These results support those histologists who have long insisted that nerve fibers are not present in dentin proper. Yamada and associates⁸ were unable to record activity from the intact tooth. However, responses were obtained from the mandibular branch when the stimulus reached the dentino-enamel junction.

Electrophysiologic methods were employed in some of my investigations which were concerned with the types of fibers within the tooth pulp and gingiva. Impulses arising after stimulation of the tooth pulp and gingiva were recorded from the gasserian ganglion of 35 adult cats. The response time of the photographed action potentials was measured, conduction velocities were computed, and responses classified according to type of fiber. Details of the experimental method have been published elsewhere.⁹ The results of these experiments on stimulation of gingival tissue indicate that only fibers of group A are seen (figure 1). The beta fibers of group A, as noted, conducted at an average velocity of 60

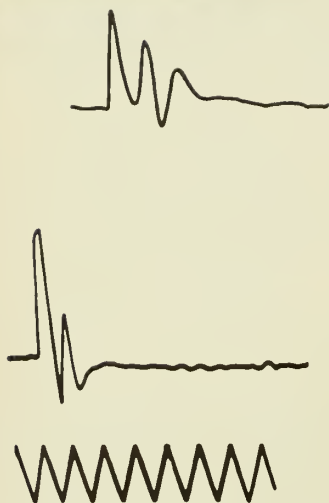


Fig. 1. Action potentials as viewed on the cathode-ray oscilloscope after electric stimulus applied to the gingiva. Recording electrodes were positioned in the gasserian ganglion. Time signal was 1,000 cycles per second.

meters per second. The gamma-delta fibers of the A group, which may be expected to transmit mostly pain, warmth, and cold, had an average velocity of 27 meters per second.

The principal response to stimulation of a tooth was from pulpal excitation or from spread of the stimulus to adjacent excitable tissues. Yet, the opportunity to observe enamel resistance also held interest. The canines, being the most accessible teeth in a cat, were used almost exclusively. The lips were held back with sutures to reduce the possibility of interference with the stimulating electrode. The tooth was carefully dried to prevent saliva from spreading electric current. For the stimulus, intensities up to a maximum of 150 volts were applied to the enamel. Due to the high resistance of enamel, a trigeminal response could not be induced at any of the intensities with which action potentials could be provoked by stimulation of other areas innervated by the fifth nerve. It has been shown that dry enamel is a nonconductor of electricity.¹⁰ Therefore, I moistened the enamel surface and then recorded action potentials. The wetter the surface, the easier it was to pick up the potentials, some of which had the same pattern as those seen after gingival excitation, and some had a pattern similar to that observed when pulp was excited. Apparently, the electric activity was due to the spread of stimulating current to the soft tissues, while the only result of enamel stimulation was the shock artifact. Next the dentino-enamel junction and dentin were exposed. The electrodes were placed on the dry dentin and stimulation started. The stimuli resulted in action potentials similar to those produced by direct pulp stimulation. Should saliva contaminate the

field, action potentials like those conducted by fibers of the gingiva would appear again. Whether the stimuli were conveyed to the pulp by the dentin, by processes of the dentino-enamel junction, or by other means, I do not know.

In some experiments, the pulp was exposed, and the electrode was placed directly into the pulp chamber (figure 2). The average velocity of the pulpal nerve fibers was 18.1 meters per second. This classified them as transmitters of pain and temperature modalities. An occasional response, which was actually similar to that called "touch response," was seen. This probably took origin from outside the pulp canal. Evidence of activity suggesting the presence of fibers of group C could not be elicited.

Some profound research on the nervous mechanism active during pain has been conducted by Brookhart and associates.¹¹ Part of their study included examination of the conduction characteristics of afferent fibers from the tooth pulp. This work indicated that fibers of the dental pulp resemble the smaller fibers of the A group in structure, conduction velocity, and excitation. They were also unable to show activity suggesting presence of fibers of the C group.

Study of the functional characteristics of trigeminal conduction has been carried beyond the peripheral nerves into the central nervous system itself.^{7,11,12} Sites in the cerebral hemisphere at which stimuli applied to the pulpal fibers of the teeth and peripheral fibers innervating the gingiva were recorded are shown in figure 3. Evidently, these sites indicate many of the possible afferent collateral pathways. The characteristics of the electric changes that were seen have not been analyzed. All that can be said is that pronounced disturbances can be noted from gross changes of base-line activity. Within the thalamus, the activity is increased, however. It is interesting to observe the frequency with which alterations in electric activity can be recorded from areas that are, strictly speaking, out-



Fig. 2. An action potential resulting from direct stimulus of the dental pulp of the left maxillary canine tooth. Recording electrodes were positioned in the left gasserian ganglion.

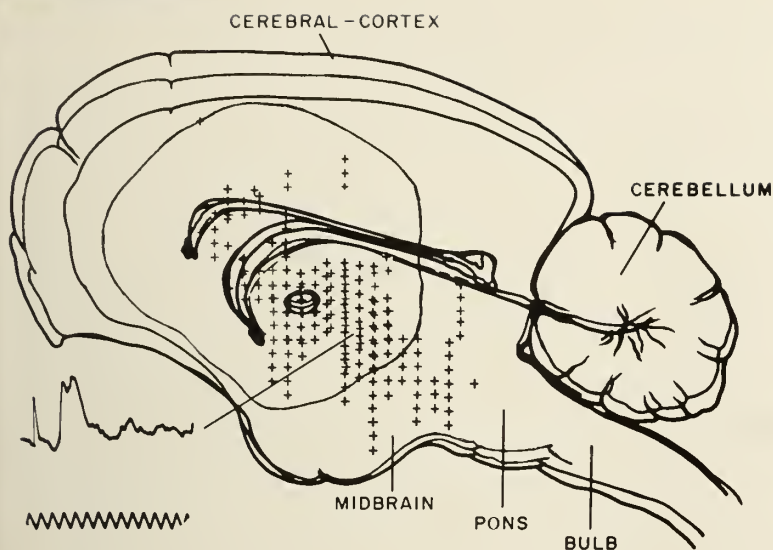


Fig. 3. A composite map of the cerebral hemisphere from which base-line changes were noted after stimulation of the contralateral gingival tissue. The + marks indicate those areas where activity similar to that shown in the inset was recorded. The cerebral cortex, pons, medulla, and cerebellum were not studied. Time signal was 1,000 cycles per second.

side the anatomic range of trigeminal conducting pathways. At present, such potentials are being more closely studied.

COMMENT

The physiologic characteristics of the trigeminal nerve have been reviewed in order to reveal the basic properties of the peripheral sensory fibers from the teeth and gingiva. The fibers originating from the gingiva include a diversity of elements. A few of these fibers conduct impulses rapidly; their rate is comparable to proprioception from the peripheral spinal nerves. These may be the fibers that are sensitive to pressure on the gingiva or the tooth. In addition, the gingival fibers contain groups which serve the perception of touch, temperature, and pain.

The rate of conduction with which the trigeminal fibers transmit these modalities of sensation indicates that their conduction occurred in med-

ullated fibers. This is also true for stimulation of the pulp, which provoked responses that can only originate from medullated fibers. Pain elsewhere is known to be transmitted as well by the slow conducting medullated group as by the unmyelinated (C group) fibers.¹³ My study indicates that the pain originating within the pulp or within gingival tissues probably depends on the slow medullated fiber system. Average conduction rates for the pulp afferent fibers were 18.1 meters per second. The pain fibers originating in gingival tissue conduct slightly faster. Probably, the apparently exclusive transmission of pain from the tooth by medullated fibers is one of the reasons why toothache is so sharp. The knowledge of basic patterns in response to electric stimulation will permit comparison of the effects of irritants at various sites of the tooth. This may give clues to the mechanisms by which toothache originates.

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Psychiatric Aspects of Pain

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AN EXACT DEFINITION OF PAIN has confounded mankind since the early dawn of history. Nevertheless, every recorded age of history has accepted the premise that pain is not alone a physical experience but includes emotional and psychologic factors. Our most modern concepts and experiments have merely provided newer and fresher confirmations of the fundamental observation that the emotions have a great role to play in the perception and reaction of an individual to what is termed "pain." Certainly, therefore, psychiatric technic does not offer anything new or original in proposing that every doctor should be aware of the psychologic aspects of the patient's pain. It does offer methods of study and recording of these psychologic aspects so that the doctor can become increasingly effective in one of his primary pursuits, that of bringing relief to those who are enmeshed in pain.

In the study of pain, it becomes clear that there can be no true separation of mind and body. Although we are, here, primarily concerned with some of the psychologic aspects of a pain produced in the physical body, we must constantly remind ourselves that the reverse situation is always possible and present. In psychiatry, for example, there is a persistent preoccupation with the aspects of pain produced in the psychic or spiritual body and their effect on an individual's physical functions. Psychiatry speaks of the "painful experiences in childhood" and of the thoughts and feelings which give "pain." One of the basic psychiatric hypotheses has been named the "pleasure-pain principle." We must often be content to define pain by agreeing that it is the opposite of anything that brings pleasure.

It may be helpful to review the etymology of the word "pain" in order to understand more fully how long bodily discomfort has been associated with emotional distress. The word itself is derived from the Latin word, *poena*, which means "penalty." This illustrates the ancient

belief that our troubles are the result of our sins; we pay the penalty for our indiscretions and violations. This type of thinking about pain is amply documented in all of the written records of antiquity. In Genesis 3:16, we find the account that is accepted by western religion as the description of the beginning of that natural and intense pain that accompanies every woman in the labor and delivery of her baby. God proclaims to that first woman, "and in sorrow you will bring forth your young." How did this come about? We read that it was a consequence of sinning; of eating the forbidden fruit. Small wonder, then, that the experience of pain always has some element of this type within it. Most children have been told, at some time when they were experiencing dental pain, "If you didn't eat so much candy or drink so much pop, you wouldn't be having all this pain with your teeth." "If you hadn't climbed up on that chair when mother told you not to, you wouldn't have fallen and chipped your tooth, and it wouldn't hurt you now." This type of episode occurs many, many times during childhood and leaves its mark in that every pain will always have some element, however small, of guilt and despair. The individual will be convinced that his pain is somehow connected to something he has done or thought which is wrong. Even today, then, when we have pain, we are paying the penalty.

The modern definition of pain was established in 1895, when Strong¹ described it as "the original sensation and the reaction to sensation." Hardy and associates² have advanced the concept that the total pain experience is composed of the sensation of pain plus associated sensations, such as heat, cold, or pressure, with an overlay of such emotional and affective states as fear, apprehension, and so forth. They accept the hypothesis that the pain experience can be separated into two component parts — the perception of pain, and the reaction to it. Beecher³ declares that the perception component can be studied just like other sensations. He concludes that the original sensation is the same for all individuals and depends chiefly on the intensity of stimulation. However, the reaction is deter-

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mined by past experience, conditioning, memory, judgment, and the present meaning of the pain to the individual. He states that this reaction is never alike for any two individuals and, indeed, with the passing of time and the accumulation of life experience, it is never exactly the same for the same individual from one time to another. In agreement with this, Haugen⁴ points out that we must constantly keep in mind the concept of the nervous system as a functional whole and not as a series of pathways to and from the cortex. If the physician works at keeping the concept of the functioning whole, he "can see how the entire patterning of a complex subjective sensation like pain may be altered by normal or abnormal activity . . . so that what the patient reports to his physician no longer needs to 'conform' to older concepts (of pain) to be valid." In other words, the doctor must be concerned with each patient as an individual and must know him as thoroughly as possible, both organically and psychologically, in order to understand fully the kind and amount of pain and the proper reasons for it.

The behavior of children after receiving a painful injury offers everyday confirmation of the dual nature of pain and of the importance of its emotional or reaction phases. They are completely overwhelmed by the "pain," but they bring it to mother, who is asked to kiss the injured site and offer positive reassurance. In all probability, the perception of the pain continues the same. The burned finger still smarts and the child continues to protect the finger and to blow his breath on it to help with the pain perception, but the overwhelming capacity of the pain is gone. Mother's kiss and reassurance have transformed the paralyzing and lethal pain experience into something that can be tolerated. Anyone trying to put ointment on that burned finger before the kiss and reassurance will be doomed to failure and desperate frustration. After the kiss and reassurance, however, the job can be accomplished. The availability of the doctor who has the medicine to relieve that perception of pain is not enough. Grave consideration must be given to that reaction component of pain, and steps must be taken to work with it or every effort will prove futile.

Freud⁵ observed that pain, whether primarily emotional or physical, comes to conscious attention from only 3 sources: (1) within the individual, himself; (2) the outside world; and (3) other people, that is, from interpersonal relationships. The astute clinician must ponder the mean-

ing of a particular pain to the individual patient and learn to understand from which source the patient feels his pain is derived. Rarely will a patient feel that his pain is directly and completely caused by the outside world. A hurricane, a volcano, or a flood can be examples of agents of the outside world that may bring pain. But, even then, most individuals are unwilling to accept such agents as the real source of their painful experience. What they consider the source of their distress is quickly revealed by such statements as: "If the government had built that levy, this flood wouldn't have destroyed my possessions and would not have crippled me and brought me all this pain." Such declarations show that the patient really assigns the cause of his trouble to his relationships with other people, as represented by the government. Or, from such statements as: "If I had gone on the trip *last* week, when I was *supposed* to, my car wouldn't have been destroyed by the flood. I wouldn't have broken my leg and had to suffer all this pain." In this case, it is easy to perceive that the source of pain is within the conflicts of the individual himself. His guilt and his self-accusation show clearly. It can be broadly stated, therefore, that most people ascribe a great proportion of their reaction component to pain to themselves or to their dealings with other, significant human beings. The doctor must attempt to discover how the patient does view the source of his difficulty before he can be fully effective, not only in the immediate relief of the pain, but in helping the patient to develop more helpful methods of dealing with the vicissitudes of his life in the future.

A doctor must never forget his role as a "participant-observer," a fundamental concept first proposed by Sullivan.⁶ He can never content himself with being a mere, disinterested observer of the things that are happening to and within his patient. He will never completely succeed in relieving the pain of his patient if he fancies that he is merely an observer and that what he says and does and feels is of no significance or concern to the patient. Most importantly, the doctor must grasp the idea that he, himself, is a participant in the patient's distress, experiences, and progress or deterioration. Consequently, the doctor must constantly examine himself in order to see what his participant role may be and how he may more expertly use this role in the effective management of the patient. Such a task is not easy, and one of the greatest difficulties arises from the fact that the physician often

plays a symbolic role, and symbols of any kind are difficult to understand, particularly when one must consider himself a symbol.

We have already referred to a common, everyday illustration of a child's behavior after sustaining an injury. Over and over again, during the formative years, the young and growing personality is impressed with a repeatedly confirmed experience that he takes pain to his parents and they, somehow, help to make the pain bearable and tolerable. Omnipotent and powerful as parents seem to the child, even they must sometimes turn to another temporal power who is even more able to correct things that have gone wrong; to make pain bearable or to even make it disappear; and to induce healing when something is not functioning properly. That temporal power is the physician. When the pain is so intense that even the parents cannot bring relief and comfort, they take the child to the doctor. So, from early childhood, people in our culture identify the persons to whom one can turn in time of great pain as the parents and the doctors, who are even more powerful. The doctor then is a fused image and symbol. He has aspects of the parents and symbolic aspects of someone in even greater authority than the parents. By understanding how the patient views his parents and how he has reacted and is reacting to them, the physician can bring the most effective assistance.

Of course, the doctor has formed many of these same types of reactions and symbols, and unless he understands how he feels about them, he is powerless to intelligently use the powers that he can command.

The following case report illustrates how important it is for the physician to fully understand his patient, and how equally important it is for him to understand himself.

A nineteen-year-old soldier was stricken with sudden paralysis of his lower extremities on the day before he was to go on leave to his mother's home. He was hospitalized, and for three and one-half weeks, he was given a most complete and thorough medical, laboratory, and neurologic investigation. He was examined on repeated occasions by very competent medical officers. Finally, a diagnosis of hysterical paralysis was established. His symptoms and his clinical picture were of such a dramatic and classic nature that the diagnosis could have been established within a very short period by anyone with even a rudimentary knowledge of diagnosis. The diagnosis was delayed because the medical offi-

cers could not understand how hysterical paralysis could develop in any soldier just before he was to go home on leave. They would not have hesitated a minute if the clinical syndrome had developed on the day he was due to return to duty, but they were stupefied to think that it could possibly happen the way it really did.

This is an outstanding example of how the doctor can read his own conflicts, feelings, and prejudices into his patients and, consequently, how he can fail to bring proper help to his patient. If the doctors had been looking at the patient and his needs instead of at their own feelings, frustrations, and wishes, the diagnosis could have been established rapidly and treatment instituted. This type of thing can easily happen to the patient in pain. If the physician does not realize how his own feelings and judgments of pain can operate and prevent him from truly understanding the type of pain the patient has, he will make repeated mistakes in trying to bring relief.

As soon as the soldier received psychotherapy, it became evident that he was in the vortex of a violent emotional conflict. His father had been a coarse and active man. His mother had been a sensitive and quiet person, who had turned to the patient, her eldest son. She had sought from the boy many of the psychologic gratifications which her husband had failed to provide. When the boy was in his early teens, his father became involved in a fight with one of his co-workers, was seriously injured, and subsequently died. The boy literally became the head of the family and was rescued from what was an untenable position by going into the army. Now that his military service was nearly over, he could not bear to return to the scene of conflict. This explained the paralysis on the eve of his return home. If the doctors could have thoroughly understood him and his motives and their own feelings and how they obstructed their observations, the situation would have been more speedily resolved. Of course, this is an example of emotional pain, but the principles apply to physical pain just as well.

Pain can be considered a disaster. Adrian⁷ reports that pain is a feeling "capable of dominating all other symbols . . . urgent and undesirable as possible . . . reminding us of our frailty." Schilder⁸ states: "Pain is not merely a local sensation, but an impairment of the activity of a total body. It, therefore, sums up the dangers threatening the body and the inabilities of individuals to master the situation in which they

are. It is thus a central point in which all the complexes, fears, and attitudes of the individual find their expression." These two accounts, as well as the numerous observations that we can all make within ourselves and about others, confirm the plausibility of considering extreme pain as an individual disaster. If this premise is accepted, it seems pertinent to review the work that has been done in the study of human community disasters, so that some of the principles which have been established to relieve community disasters may help us in considering methods that can bring relief to an individual disaster, such as pain.

Studies of the American Psychiatric Association^{9,10} have indicated that one way to minimize the effects of a disaster is to explain to a community what to expect and what to look for when a disaster strikes. For example, during the Texas City oil explosions, many people became panic-stricken because they thought they were facing an atomic bomb disaster. They did not know that all atomic weapons produce a light of such intensity that it has been described as "brighter than the noonday sun." Since there was no such light, obviously some other agent was responsible.

In our discussion of pain, we are most properly preoccupied with dental pain. Certainly, it would be helpful if youngsters could be introduced to the dental office and the dentist before the individual disaster of pain occurred. The fear and panic would be partially alleviated if the child knew what to expect. A dentist of my acquaintance regularly proposes that parents bring the youngest child to the office when other members of the family are having dental work done. The child begins to understand the doctor and the place before any work is undertaken or pain is felt. To adults, an explanation of the procedures and the reason for them makes the attendant discomfort easier to bear. The periodontists utilize this technic a great deal because they must have the patient's cooperation over a long period of time if their procedures are to be truly effective. Grinding the teeth down is somewhat painful to the patient, and it is more painful if he does not understand why this must be done to a healthy, painless tooth.

A second principle in community disasters has been the practice of handling symptoms of doubt and fear promptly as they arise. When the doctor perceives that a patient is becoming fearful and doubtful about his situation, he should immediately attempt to discover the source of this

anxiety, and attempt to remove it. If ignored, it will not disappear. The fear and doubt will grow and so will the pain and distress. And, as with most matters in clinical practice, they will be harder to deal with the longer they exist. Not only will prompt handling of newborn fears and doubts help relieve the patient of pain, but it will save the doctor time and effort in the long run, and his patient will continue to come to him for help and relief in time of pain disaster.

A third principle affirms the fact that people are entitled to feel as they do about situations in which they find themselves and that the reality of their complaints must be accepted by the physician. The doctor must also fully accept the reality of the pain which the patient feels. It is easy for physicians of today to say, "Although the patient's pain is due, primarily, to his emotional make-up, I know that it is just as real as any other kind of pain," but it is a bit difficult for many doctors to believe. And, yet, they must believe and truly understand it if they are to be of help. When the doctor believes it, he will look more closely at the reasons for it, and he will then be able to determine what kind of help and how much he should give to the patient.

A fourth principle in community disaster emphasizes the importance of immediately identifying persons with major emotional illnesses and evacuating them to areas where more intensive help can be given. It is in keeping with the ethics and practices of the physician to learn to diagnose clinical conditions properly and learn which conditions he can help and which he must refer to other colleagues. The surgical services of many hospitals used to have a favorite syndrome. If a patient had 3 surgical scars on the abdomen, 1 over the appendix area, one over the gallbladder area, and 1 in the abdominal midline, this was known as the "psychiatric triad" and established the diagnosis of some major emotional pathology. Although it had its humorous aspect, it lost sight of the fact that a human being had been in pain and had come to a doctor for help and relief. The physician had not tried to see the proper cause and had gone blindly ahead with the only tools and techniques that were familiar to him. Finally, when the patient had no more room on his body into which the surgeon could cut, the possibility of emotional components of the pain could be considered. The resultant crippling and misery of that human being, the patient, interested the doctor no more, and the patient could then be referred to someone else. Any physician today would be crim-

inally negligent if he did not perceive the emotional implications in the patient's pain, and, if the implications were of major proportions, he would be negligent if he did not "evacuate" the patient to an area where more intensive assistance could be administered.

In summary, the truly successful management

of pain depends on two people, the patient and the doctor. The heaviest burden lies with the doctor, who must not only understand the patient and the pain but must engage in that most painful of processes, understanding himself. If he can accomplish all this, he will surely bring a fresh breath of hope to a pain-wracked world.

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Editorial

"OUR ANTAGONIST IS OUR HELPER"

—EDMUND BURKE (1790)

THE COMPLEXITY of the nervous system is most baffling. It will be a momentous occasion indeed, if that day ever comes when we can say that we fully understand this intricate structure and know precisely what to do for it when it is out of order. Nonetheless, every contribution to the problem marks some sort of progress toward the ultimate objective, and the papers by Dr. Gibilisco and by Dr. Gianakon in this issue represent useful contributions toward such an end.

There seems to be little doubt that analgesic agents, such as methadone hydrochloride, dihydrocodeine (Rapacodin), levorphan tartrate (Levo-Dromoran tartrate), dihydromorphinone hydrochloride (Dilaudid hydrochloride), morphine (to mention a few) can be used in ever-increasing doses when they are buffered either with amiphenazole (Daptazole) or levallorphan tartrate (Lorfan tartrate). Since the advent of antagonist agents, there is slight likelihood of respiratory depression if the antagonists are used with the depressant drugs. Still, the possibility of addiction is always a concern when narcotic agents are used.

It is apparent that the major functions of the nervous system can be arrested almost every

night for seven or eight hours by means of such drugs as promethazine hydrochloride (Phenergan hydrochloride), alphaprodine hydrochloride (Nisentil hydrochloride), or WY-757 plus either Daptazole or Lorfan tartrate plus a drug to induce sleep, such as 500 mg. of ethchlorvynol (Placidyl) or 0.5 gm. of glutethimide (Doriden). Sometimes, an additional dose of the soporific agent should be given; usually, the sleeping potion is administered one hour after one of the other three has been administered.

Such an arrangement almost invariably assures the patient a full night's sleep free of pain. When morning comes, he is rested, the nervous system appears to resume function, and the patient is much more able to face and deal with his problems than he would be after a restless night.

It may be necessary to carry on this regimen for some time before it can be decided just how beneficial it is to the patient. Such a decision is not difficult, for once the patient is deprived of normal sleep again, he will complain bitterly. Thus it is that another definite advance has been made, meaning that it is now possible to afford relief of pain for periods of sometimes a fourth to a third of the twenty four hours of the day, regularly and for prolonged periods without the hazard of addiction. The achievement is not quite complete, however, because for some reason this regimen seems to do more for some patients than for others.

JOHN S. LUNDY, M.D.

Book Reviews on Pain

MANUAL OF ANESTHESIOLOGY FOR RESIDENTS AND MEDICAL STUDENTS, by HERMAN SCHWARTZ, S. H. NGAI, and E. M. PAPPER: From the Anesthesiology Service, The Presbyterian Hospital, and Department of Anesthesiology, Columbia University, College of Physicians and Surgeons, New York City, 1957. Springfield, Illinois: Charles C Thomas, 170 pages. \$4.25.

This monograph is a part of the American Lecture Series. It deals with fundamentals and provides explanations of records and charting and the signs and stages of general anesthesia. The authors discuss premedication, giving drugs and doses, and the neural and chemical control of respiration. The book contains an excellent chapter on pulmonary function. There is a chapter on the transport of respiratory gases, one on the heart and coronary circulation, and another on peripheral circulation. These chapters are short and can be easily and quickly read. They emphasize the important points which the beginner should know. Chapters on the autonomic nervous system and the anatomy of the upper part of the respiratory tract are included, as are a chapter on the physics of anesthetic gases and vapors and a chapter on intravenous anesthesia, including rectal anesthesia. Agents which are muscle relaxants and the antagonists to them are described. The chapter on the complications of general anesthesia is very well done, and should be especially helpful.

This book is intended to be a manual only, meaning that everything having to do with anesthesia could not be included in it. Yet the main points which will serve as a firm foundation to the beginner are mentioned, and more extensive subjects in this field can be explored further in other works. Some special principles of pediatric anesthesia are presented. There are chapters on local anesthesia, spinal, caudal, and epidural anesthesia; another on obstetrical anesthesia and one on resuscitation. Surgical emergencies that concern the anesthesiologist are set forth. Sound remarks on the hazards of fire and explosion are included, and tables of normal values are given.

This manual is indexed and is printed on good paper. It is a much-needed work and should be made readily

available to those who administer anesthetic agents, and particularly to those charged with teaching. The book will have a special value to those who are about to take board examinations.

JOHN S. LUNDY, M.D.

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MUSCLE RELAXANTS IN ANESTHESIOLOGY, by FRANCIS F. FOLDES, M.D., director, Department of Anesthesia, Mercy Hospital, Pittsburgh; associate professor of anesthesiology, University of Pittsburgh, School of Medicine, 1957. Springfield, Illinois: Charles C Thomas, 210 pages. \$5.50.

This book is a most important contribution to the use of anesthetics. It is most timely, since the use of balanced anesthesia has become common practice, and the muscle relaxants have made modern anesthesia a pleasure rather than a struggle.

A glossary is presented at the beginning of the book, which, in itself, is important because there is much loose talk among users of relaxants and not enough specificity in the words chosen. An interesting history of muscle relaxants occupies chapter 1, and this is followed by a very fine presentation of the chemistry of the agents, including the structural chemical formulas of them all. A chapter on the physiology of neuromuscular transmission is well illustrated, as well as a chapter on neuromuscular block. Chapter 5 is concerned with the pharmacology of muscle relaxants.

Part 2 of the book discusses the clinical use of the agents, the technic of administering muscle relaxants, and the use of the antagonists of muscle relaxants are considered in chapters 6 and 7. Chapter 8 deals with complications of the use of muscle relaxants; this chapter should be read and reread. Chapter 12 is devoted to the special uses of various procedures, for example, endotracheal intubation, and so forth.

An important list of 414 references is included, which again is timely, for it may be impossible to make a complete bibliography at any future date. Fortunately, the author decided to include both an author index and a subject index, which makes the book more useful. For those who administer anesthetics, this book is a "must!"

JOHN S. LUNDY, M.D.

Current Literature on Pain

CHLORPROMAZINE HEPATITIS WITHOUT CLINICAL JAUNDICE, by L. G. BARTHOLOMEW and J. C. CAIN: Proc. Staff Meet., Mayo Clin. 31:201-204, 1956.

"Chlorpromazine (Thorazine) jaundice has become a well-recognized clinical syndrome. Recently, the question has arisen as to whether damage to the liver might occur in the absence of clinical jaundice, a situation analogous to anicteric viral hepatitis . . . Recently, a patient who had severe neurosis manifested by abdominal pain was treated with Thorazine hydrochloride. In the course of his treatment, hepatomegaly developed.

. . . Although this patient did not have clinical jaundice, the liver did enlarge until it became easily palpable, and a slight elevation of the value for serum bilirubin took place. Microscopic examination of a section of tissue from the liver revealed hepatitis similar to that found in patients who have Thorazine jaundice. It seems significant that this patient had no symptoms characteristic of damage to the liver. In a recent study of 23 patients who had proved Thorazine hepatitis with jaundice, certain clinical features were evident. In 9 of these patients the onset of illness was abrupt. Generalized pruritus developed in 20, dark urine in 19, nausea in 13,

fever in 11, frequently with a temperature as high as 103° F., and true chills and anorexia in 10. Nine patients were affected by significant vomiting. Pain was not a confusing symptom, since only 1 had pain in any way simulating that of gallbladder colic. Six patients had malaise, 2 noticed weakness, and 1 had melena.

"All these 23 patients were clinically jaundiced at some time during their illness. The liver was easily palpable in 11 of these patients, and the spleen was palpable in 4. Loss of weight was not prominent, for only 7 had lost more than 10 lb. Twelve of the patients had mild tenderness in a wide area across the upper part of the abdomen. In practically all of these patients, results of the thymol turbidity and cephalin flocculation tests were normal. The values for alkaline phosphatase, on the other hand, were unequivocally elevated. The laboratory findings . . . were consistent with those usually seen in the presence of incomplete obstructive jaundice . . . It would appear that Thorazine hydrochloride in some instances may produce hepatitis without clinical jaundice . . . Routine examination of the abdomen by the physician who administers Thorazine may aid in the early detection of Thorazine hepatitis."

From LUNDY, J. S., and MCQUILLEN, FLORENCE A.: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1956, Vol. 44. Copyright by J. S. LUNDY.

WHAT IS PAIN?, by K. B. CORBIN: *Proc. Staff Meet., Mayo Clin.* 31:205-208, 1956.

"Pain is an unpleasant sensation usually evoked by a noxious stimulus, generally accompanied by psychologic and emotional reactions and oftentimes leading to autonomic responses. All animal species react to painful stimuli; the higher the animal form, the more elaborate the mechanisms used to avoid injury and, hence, pain . . . It would appear that pain receptors are present in the entire cutaneous surface of the body, in the mucous membranes lining the external orifices, in the cornea, dentine, periosteum, deep fascia, skeletal muscles, joint structures, blood vessels, parietal pleura, and peritoneum. Sensitivity to pain also is found in the capsules of the solid viscera, the renal pelvis, ureter, bladder, and urethra. Not all these organs respond to the same types of noxious stimuli . . . Most neurophysiologists believe that in the matter of the basic perception of pain there are specific pain receptors—simple, unencapsulated, naked endings—rather than that pain is the result of overstimulation of thermal, tactile, or other sensory receptors. Impulses set up in peripheral nerves by painful stimulation pass centrally over small, unmyelinated fibers as well as medium-sized myelinated ones. The larger fibers are thought to account for the first or pricking pain response; the second, or burning, pain response travels over the fine and, therefore, the more slowly conducting fibers . . .

"The reaction to pain is a complex psychologic and physiologic response involving the highest cognitive and integrative cerebral mechanisms . . . Somatic pain provokes a so-called defense reaction consisting of an increase in the output of epinephrine, with concomitant cardiac acceleration, increase in blood pressure and vasoconstriction. Visceral pain, on the other hand, leads to almost opposite effects; in other words, there is a decrease in blood pressure and a decrease in heart rate; nausea and vomiting occur, and there is an attempt to withdraw to safety . . . Superficial pain is initiated by any noxious stimulus, be it mechanical, thermal, chem-

ical, or electrical. It has a bright, pricking, and burning quality. It is accurately localized. It exhibits the double response. Its mechanism is not known . . . Deep somatic pain results from injury to fascia, periosteum, joints, ligaments, and tendons, and visceral pain arises from injury to the viscera. Deep somatic pain is dull, aching, diffuse, and poorly localized and frequently is accompanied by cutaneous tenderness . . .

"An example of referred pain is that which occurs over the trapezial ridge as the result of diaphragmatic irritation. The distribution of such pain usually is within the same segments as the sensory supply of the diseased viscus . . . Central pain is that which is characterized by the absence of any demonstrable peripheral cause. Although central pain occasionally is caused by organic lesions of the sensory gray matter and sensory tracts of the central nervous system, most so-called central pain originally had a peripheral source which has long ceased to be a verifiable focus . . . Central pain usually is associated with marked anxiety and personality disorganization.

From LUNDY, J. S., and MCQUILLEN, FLORENCE A.: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1956, Vol. 44. Copyright by J. S. LUNDY.

DIFFERENTIAL ACTION OF ANESTHETICS AND INTERNEURON DEPRESSANTS UPON EEG AROUSAL AND RECRUITMENT RESPONSES, by ELLEN EVA KING: *J. Pharmacol. & Exper. Therap.* 116:404-417, 1956.

"The present study was designed to provide evidence relative to the concepts that a preferential blockade of conduction in the ascending reticular activating system is important in general anesthesia and that such blockade is due to the selective depression of interneurons involved in pathways ascending to the cortex from the cephalic brainstem. A method has been developed for the comparison of the influence of anesthetic agents and nonanesthetic, interneuronal depressant compounds upon two evoked electrocortical alterations utilizing extralemnisal ascending brainstem pathways and thought to be related to wakefulness and sleep. These responses, the recruiting response and the EEG arousal reaction, were recorded with simultaneous monitoring of the classical sensory pathway. The three types of anesthetic agents tested were ether, chloralose, and barbiturates; the interneuronal blocking agents were mephenesin, 6-methyl-2-aminobenzothiazole, and 4-chloro-2-amino-benzothiazole . . . Experiments were performed on 36 adult cats . . . Barbiturates blocked arousal at very low doses, but enhanced the recruiting response. Chloralose in low doses enhanced recruiting, at higher doses depressed it; arousal was blocked by anesthetic doses. Ether markedly depressed responses to stimulation of either system. The interneuron depressant agents, mephenesin, 6-methyl-2-aminobenzothiazole, and 4-chloro-2-aminobenzothiazole, depressed the recruiting response, but left EEG arousal from stimulation of the reticular formation unimpaired. It is suggested that the pathway for cortical arousal from the reticular activating system need not utilize the diffuse thalamic projection and may not depend upon interneuronal connections. The data are considered to supply evidence that certain features of the anesthetic state may depend upon selective depression of the ascending reticular activating system."

From LUNDY, J. S., and MCQUILLEN, FLORENCE A.: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1956, Vol. 44. Copyright by J. S. LUNDY.

Surgery of the Eye: Diseases, by ALSTON CALLAHAN, M.D., F.A.C.S., 1956. Springfield, Illinois: Charles C Thomas. \$25.00.

This is a large volume on ophthalmic surgery of the pathology brought about by nontraumatic disease. The book contains 447 pages, is printed on high quality glossy paper, and is bound in an artificial leather type of plastic material.

In addition to 27 chapters, an appendix is included which contains 2 parts. Part I is titled *Advances in Management of Injuries of the Eye*, and discusses some of the commoner types of intraocular injuries. Corneal lacerations, for example, are well handled with beautiful illustrations. Part II is titled *Advances in the Management of Injuries of the Ocular Adnexa* and covers the commoner injuries above the lids and the adnexa and shows how these should be cared for.

This excellent text on surgery is beautifully printed, and the illustrations are simply outstanding. Dr. Callahan has sacrificed many words for these illustrations, which have added materially to the quality of the book. The most outstanding feature, however, is the fact that he has not filled his book with many



controversial or questionable techniques, but has adhered strictly to that which appears to be his own personal experience. For this reason, the book is not an encyclopedia of surgical methods. Rather, it is one man's ideas on what he himself has found to be surgically worthwhile. Parts of it are rather brief. I think this is understandable. For example, he has described the classic technique of goniotomy for infantile glaucoma. Beyond this he offers little. Most of us have had little or no experience with this rare malady, and, so far as the literature is concerned, only one or two people in this country are considered authorities on the subject.

It is obvious that Dr. Callahan has in mind the surgery that is required of men who do ophthalmic surgery in private practice. He de-

votes a great deal of attention to cataract extractions and to glaucoma. He does not devote a lot of time to the currently popular keratoplasty techniques. We feel this also is wise.

We feel this book is a very worthwhile addition to the library of any practicing ophthalmologist.

FRANCIS M. WALSH, M.D.
LEON D. HARRIS, M.D.

Epileptic Seizures, edited by JOHN R. GREEN, M.D., and HARRY F. STEELMAN, M.D., 1956. Baltimore: Williams & Wilkins Co., 165 pages. \$5.00.

This is an excellent book and most helpful not only to physicians, but to many intelligent epileptic patients and their relatives and teachers. It is written by a group of experts in the field. There are chapters on diagnosis, medical treatment, psychomotor epilepsy, the psychologic problems in epilepsy, the education of epileptic children and young adults, the relation between cerebral palsy and seizures, the relation of colleges to epileptics, and the employment of epileptics.

A tremendous amount of information is supplied, and short bibliographies accompany several chapters.

WALTER C. ALVAREZ, M.D.

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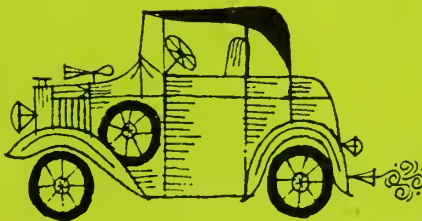
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News Briefs . . .

North Dakota

DR. ROBERT C. PAINTER of the Grand Forks Clinic was granted a fellowship in the American College of Physicians at the recent annual meeting of the group in Boston. Dr. Painter, who joined the clinic staff in 1950, specializes in internal medicine.

DR. F. D. PETERKIN, who practiced medicine at Langdon for four years, until leaving ten months ago, has returned to resume his practice. Dr. Peterkin left Langdon to accept a position on the obstetrical staff of St. Joseph's hospital in London, Ontario, and was engaged there until September, when he went to Guelph, Ontario. Here he was associated with Dr. W. B. Harcourt. After leaving Guelph April 1, Dr. Peterkin took a special two-weeks course in surgery at Cook County hospital in Chicago.

DRS. OLIVER STORSTEEN and APOLLON MARTENS recently joined the staff of the Fargo Veterans Hospital. Dr. Storsteen, who is with the surgical staff, is a native of South Dakota and received his medical degree from the University of Nebraska. After interning in the University Hospital in Omaha, he studied pathology for a year at Kansas University, served two years in the Navy medical corps, and, after his release, he was in Rochester, Minnesota, for a four-year fellowship in the Mayo Clinic. Dr. Martens, who is a medical examiner in the outpatient clinic, is a native of Poland where he was in practice when the country was overrun by the Russians in 1939.

After escaping from a concentration camp in Germany, he was employed by the American occupation forces until 1948, when he came to the United States and interned at St. John's Hospital in Fargo. Since 1950, he has been in private practice at Killdeer and Bownman.

DR. HERBERT J. WILSON, New Town, was recently re-elected president of the North Dakota Tuberculosis and Health Association. Dr. Robert Tudor of Bismarck was again named vice-president.

DR. MARVIN J. GEIB, Moorhead; and DR. JOHN G. FREEMAN, Jamestown, have been appointed to the Board of Medical Advisors of the North Dakota Chapter of the National Multiple Sclerosis Society.

Minnesota

RESEARCH GRANTS totaling \$223,371 have been awarded to 5 University of Minnesota scientists by the American Cancer Society. The grants were part of a \$4,636,651 award for research distributed among 243 scientists in 108 universities and medical centers in 35 states. Dr. Joseph B. Aust was awarded \$45,000 to study acquired tolerance in relationship to hormone transplantation; Dr. Cyrus P. Barnum received \$12,454 to study the physiologic control of cell growth at the metabolic level; Dr. John J. Bittner was awarded \$18,286 to determine the biologic characteristics of the mouse mammary tumor agents; Dr. Jerome T. Syverton was granted \$139,535 to make experimental studies of cells, viruses, and cancer; and Dr. Lee W. Wattenberg received \$8,096 for a vitamin relationship study.

DR. JOHN J. BITTNER, director of the University of Minnesota, is the recipient of the grant.

(Continued on page 28A)

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Repair of Nasal Defects Involving Tissue Loss

JOHN B. ERICH, M.D.

Rochester, Minnesota

PRACTICALLY all defects of the nose, whether of traumatic or surgical origin, require some form of skin graft for repair. Such transplants may be Thiersch (shave) or full-thickness free dermal grafts or pedicle grafts. If a small portion of nasal skin is missing, margins of the defect occasionally can be undermined to permit approximation of the edges of the wound, and, thus, use of a skin graft can be avoided. However, when any appreciable quantity of tissue has been lost, such treatment can result only in much distortion and disfigurement. In such cases, application of a skin graft is preferable.

Free-skin transplants, that is, shave (Thiersch, split-thickness) or full-thickness (Wolfe, dissected) dermal grafts, have a limited degree of usefulness in nasal operations because they can be employed only on superficial surface defects in which the underlying and adjacent tissues are not badly scarred or changed by irradiation. If tissues around a defect are so affected, a pedicle flap of skin must be used if sloughing of the transplant is to be avoided. Shave and full-thickness grafts are completely detached from the donor site. They maintain their viability only through the vascular supply of the bed of tissue in which they are placed and, consequently, cannot be expected to heal properly in tissues whose

blood supply is inadequate because of previous irradiation or excessive scarring. Furthermore, free grafts cannot be employed over a hole or perforation which has no blood supply at all. A flap of skin, on the other hand, has its own blood supply through its pedicle, which is not severed until enough new blood vessels have grown between the edges of the defect and the graft to establish adequate circulation in the transplanted portion of the flap. When a flap is properly prepared and transplanted, it should have little, if any, difficulty in surviving even though the defect in which it is placed involves



Fig. 1a. Postoperative defect on dorsum of nose due to removal of a basal cell epithelioma by electrocoagulation. (b). Defect corrected with a full-thickness graft from postauricular region.

JOHN B. ERICH is associate professor of plastic surgery in the Mayo Foundation and is head of the Section of Plastic Surgery at the Mayo Clinic.

Read at the Sectional Meeting of the American College of Surgeons, Milwaukee, February 27-29, 1956.

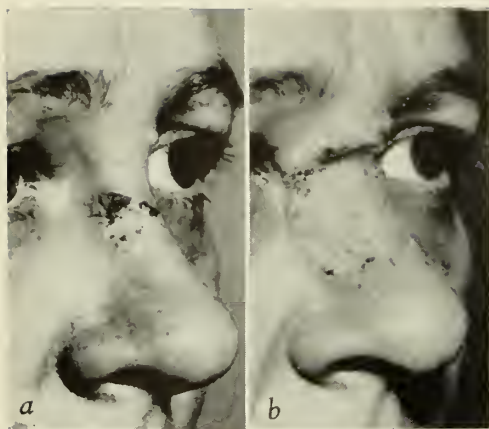


Fig. 2a. Basal cell epithelioma on bridge of nose. (b). Two weeks after lesion was excised and replaced with a full-thickness skin graft from the postauricular region. Edges require several weeks to smooth out.

a hole or is composed of tissues which have been irradiated or are badly scarred.

If the nasal defect consists of a superficial loss of skin and the area is not too large, a full-thickness skin graft dissected from the posterior auricular region is highly desirable, because the color and texture of the skin obtained in this situation closely resemble those of the face (figures 1 and 2). However, when the surface defect is large or involves the whole nose, sufficient skin cannot be obtained from behind the ear. Consequently, one is forced to use a full-thickness skin graft from the clavicular region or a shave-dermal transplant from the arm, thigh, or abdomen. In my experience, a full-thickness dermal graft taken from the clavicular region has a more satisfactory color for nasal transplantation than shave grafts. However, the former is often rather thick, and healing may not be satisfactory. Consequently, when the area denuded of skin on the nose is large, I prefer to use a split-



Fig. 3a. Actinodermatitis of nose. (b). Skin over entire nose excised and replaced with shave-skin graft from the abdomen.

thickness graft obtained from the abdomen or thigh. Such Thiersch skin grafts are thin and usually take nicely (figures 3 and 4). In addition to a rather poor color, they have another serious fault, which is the development of pigmentation in their deeper layers. While this complication by no means always occurs, it is one that cannot be prevented.

When shave or full-thickness transplants are employed over the nose, immobilization is one of the most important factors contributing to the success of such skin grafting. To gain proper fixation of the graft, it is well to leave the sutures, which anchor the graft to the margins of the defect, very long (figure 4b) so that they can be tied over a bulk of gauze or cotton (figure 4c). This technic is of much value in rendering the graft immobile and also in preventing subsequent hematomas. In addition to this measure, further immobilization can be obtained by application of a metal splint over the nose held in place with adhesive tape.

Full-thickness grafts are inlay grafts and must



Fig. 4a. Excision of all skin on the nose for actinodermatitis. (b). Raw surface covered with a shave-skin graft from the abdomen. Anchoring sutures are left long. (c). Sutures are tied over gauze and cotton for immobilization of graft. (d). Postoperative result two weeks after operation. Edges will smooth out in time.

Fig. 5a. Defect in left nostril due to removal of epithelioma by electrocoagulation. (b). Defect corrected with composite graft from lobe of left ear.



be cut to the same size and shape as the denuded surface. This can be accomplished by means of a lead pattern, (cut from lead sheeting) of the defect. Furthermore, I also prefer to transform shave-dermal transplants for nasal repair into inlay grafts; that is, to cut them in such a manner that their contour duplicates that of the defect. In order to trim a Thiersch graft to the desired shape, a lead pattern again is employed. It is laid over the graft while it is still stuck to the dermatome. Cutting around the pattern with a scalpel then removes a portion of split-thickness skin, which has the same size and outline as the defect. Thus properly shaped, the piece of skin is inlaid into the defect on the nose.

It is not uncommon to see patients with a small loss of tissue involving an ala, the columella, or the free edge of a nostril. Such defects often can be repaired quickly and effectively by a free composite graft of skin and cartilage taken from the ear, as described by Brown and Cannon,¹ or by a composite wedge of tissue taken from the lobe of the ear, as designed by Dupertuis.² This technic consists in cutting out a segment of the helix of the ear or of the lobe (figure 5) and transferring this piece of tissue to the nasal de-

fect. Usually, the deficient area on the nose must be changed by sharp dissection into a sort of wedge-shaped or rectangular loss of tissue, and the transplant from the ear must correspond in size and shape to the defect in order that the composite graft may be properly inlaid. Such a graft is sutured in place and immobilized with a Vaseline pack within the nostril and metal splint externally.

Both simple and tubed pedicle flaps of skin are employed for the repair of defects about the nose. A simple pedicle graft always is constructed as a flat flap of tissue and, usually, is elevated in situations which permit direct transference of the flap to the defect (figure 6). When used to repair loss of tissue on the nose, such flaps are elevated adjacent to the defect or on the forehead or cheek.

A tubed graft of skin is a cylindrical-shaped structure with skin forming its outer surface and fat its inner core. Tube flaps are constructed in such a manner that no raw surface is ever left exposed regardless of how transference or transplantation of the flap is effected. The general plan of elevating and tubing a pedicle flap is illustrated in figure 7. This process eliminates external raw surfaces when the flap is transferred, thereby preventing infections and development of excessive scar tissue in the flap. Furthermore, tubing a flap actually increases its blood supply. For repair of defects about the nose, tube flaps are elevated on the neck or trunk.

When a pedicle flap is employed to repair some defect in which there is a perforation through the nose, that portion of the flap which covers the hole must be lined with skin. Otherwise, the exposed raw surface of the flap covering the perforation becomes excessively scarred. This scarring, in turn, causes contractures and distortion of the reconstructed part. As a matter of fact, every through-and-through defect of the

Fig. 6. Simple rotation of flap. (a). Flap is elevated adjacent to defect as illustrated by solid line. It is later transferred to the position occupied by dotted line. (b). Flap has been rotated over and sutured. Redundant skin is removed by excising a triangular portion of tissue as illustrated by dotted line. (c). Wound completely sutured.

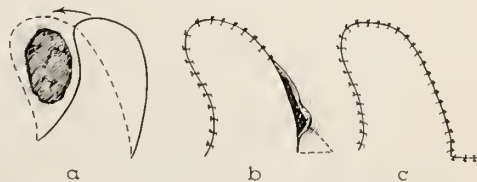
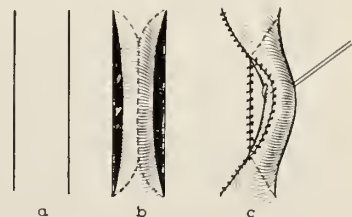


Fig. 7. Preparation of a tube flap. (a). Skin and subcutaneous fat between the two incisions are undermined by sharp dissection. (b). Free margins of flap are turned under, approximated, and sutured as illustrated by dotted line. This technic produces a double-pedicle flap of skin in form of a tube; skin forms external walls and subcutaneous fat, the central core. (c). Resultant raw surface at donor site is closed by undermining skin lateral to primary incisions followed by subsequent approximation of these two margins below the tube.



nose and every loss of tissue involving the nostrils require restoration not only of the external skin but of the epithelial lining as well. There are 3 methods of lining a pedicle flap of skin, and all are employed under various circumstances for defects on the nose. First, a pedicle flap of skin can be lined by folding the distal end of the flap on itself to form an undercovering. As will be discussed later, this method of lining and forming nostrils is used during reconstruction of the lower part of a nose. The two raw surfaces of the portion folded over heal together; the external skin forms the covering for the reconstructed part, while the portion folded under makes the lining. Second, a small flap of skin adjacent to the defect with a pedicle along the free margin of the defect can be elevated, turned back with its raw surface up, and sutured to the mucous membrane at the edges of the perforation. This procedure forms an epithelial lining over which a free-skin graft or another pedicle flap can be placed for a covering. This second method of making a lining is used frequently for perforations through the nose. The third method involves use of a free-skin graft. That portion of the flap which will be used for reconstruction is undermined and lined with a shave graft at least two weeks before the flap is transplanted to the defect.

Owing to the character of most pedicle grafts, necrosis of the flap may be expected if it is elevated and transferred in one step, because the blood supply is not adequate to nourish the entire flap. This difficulty, however, can be eliminated through delay. By this technic, the flap is elevated in a series of successive stages or operations which are designed to transfer the circulation in the flap to the pedicle. By these operations, the vessels in the pedicle are stimulated to become larger until they are able to nourish the entire flap. The flap then can be transplanted without subsequent danger of sloughing. It is true that some short flaps with wide pedicles can be elevated and transplanted in one operation. However, when there is any question in regard to blood supply to a flap, the so-called delayed technic of elevating the flap and suturing it back in place several times, with resultant delay of transference, should be considered. The periods of delay necessary for the various flaps employed in nasal surgery cannot be discussed here. However, figure 8 shows diagrammatically the steps necessary in the delay of one type of flap. A small flap with a good supply of arterial blood and a wide pedicle often requires no delays in its elevation or between elevation and transference. However, a large, irregularly shaped

graft and all tube grafts require considerable time in preparation. After the elevation of a tube flap of skin, I prefer to wait one month before attempting to transplant it to the nasal defect. This delay is necessary for development of an adequate blood supply to the tube.

Three types of pedicle flaps of skin are employed in the repair of defects about the nose: (1) contiguous flaps, (2) neighboring flaps, and (3) distant flaps. Contiguous pedicle grafts (figure 6) are simple open flaps, which are elevated in tissues immediately adjacent to the defect and are advanced or rotated to cover the defect. The contour and size of contiguous flaps vary according to the shape and location of the nasal defect. There are no standard contiguous flaps in dimensions or outline.

Neighboring flaps are pedicle grafts, which are elevated in the same general anatomic region as the defect and are long enough to permit direct transference to the defect. To repair losses of tissue about the nose, neighboring flaps are elevated on the forehead and occasionally along the nasolabial fold. I employ 3 types of forehead flaps for nasal repair (figure 9): (1) a loop-shaped supraorbital flap with a pedicle over one brow, (2) a sickle-shaped temporal flap with a pedicle in the preauricular region, and (3) a vertical-forehead flap which can be elevated in the midline or over one brow. Another type of neighboring flap which I occasionally employ is elevated along the nasolabial fold, the lower end of the flap being turned up to repair certain defects on the nose.

Distant pedicle flaps are elevated in some anatomic region other than that in which the defect is located. Some of them reach directly to the defect, and some can reach the recipient site only by migration or the use of an intermediary, such as the wrist, which carries the flap to the defective part. For defects about the nose, the only distant flaps which I generally employ now are: (1) a clavicular-tube flap, which is elevated near the clavicle or obliquely across the clavicle (figure 10a), and (2) a thoracic-tube flap (figure 10b), which is elevated in a more or less vertical direction on the anterior thoracic wall. I no longer utilize cervical-tube flaps (figure 11) because of the scarring which they produce on the side of the neck. Also, I never use subaxillary-tube flaps because the distance from the nose is too great. Only in extremely rare instances do I employ an arm flap (figure 12) or a flap which is attached to the wrist in nasal reconstructive work.

The fact that so many different types of flaps are available for repair of defects about the nose,

Fig. 8. Steps in the delayed elevation and transference of a loop-shaped supra-orbital flap. (a). Flap is completely elevated and undermined as indicated by solid lines. Dotted area represents a shave-skin graft, which is inserted with its raw surface up to act as a lining when the flap is transferred to reconstruct the nose. After the lining is in place, the flap is sutured back in position as indicated. (b). Ten days later, one pedicle is cut across above the brow to stimulate growth of the vessels in the remaining pedicle. The wound is sutured. (c). Ten days later, the entire pedicle flap is elevated and sutured back in position to stimulate the blood supply. (d). Ten days later, the flap is brought down and folded to give proper contour to the nose. The resultant denuded surface on the forehead is completely covered with a shave-skin graft as indicated. (e). Two weeks later, the pedicle is cut halfway across, as indicated, and sutured back in position. (f). One week later, the pedicle is completely severed at upper margin of the defect. Unused part of the flap is returned to forehead after that part of the free-shave skin graft, which covers its bed, has been excised.

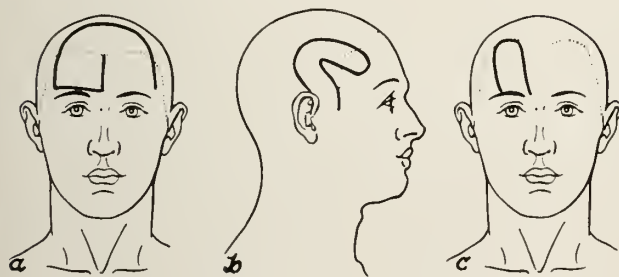
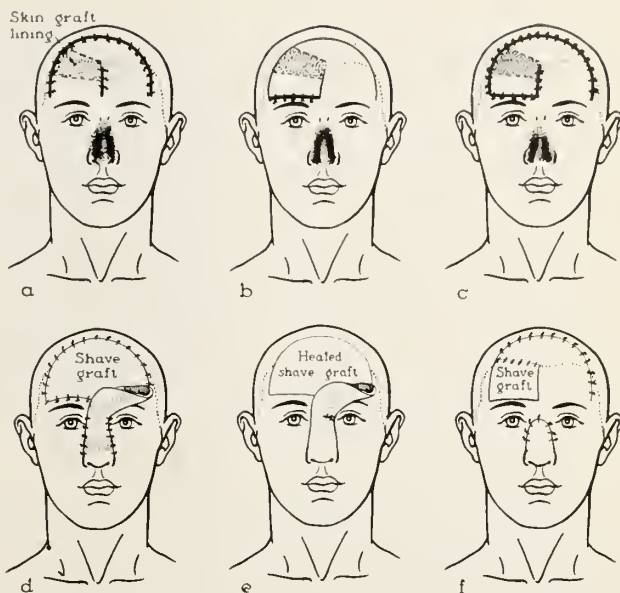


Fig. 9. Three types of forehead flaps used for partial nasal reconstruction. (a). Loop-shaped supra-orbital flap. (b). Sickle-shaped temporal flap. (c). Vertical forehead flap.

Fig. 10a. Clavicular tube flaps. One elevated along or just below the clavicle and the other obliquely across the clavicle. (b). Thoracic or chest tube flap elevated in a more or less vertical direction just lateral to the median line.

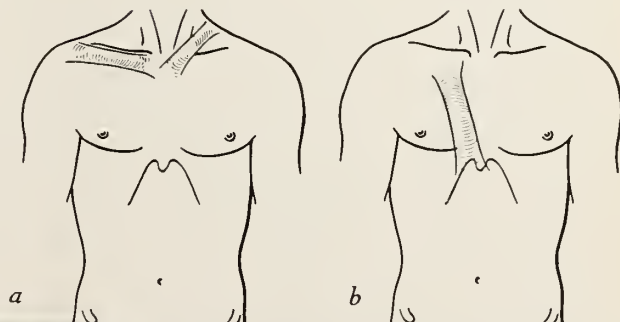


Fig. 11a. Cervical tube flap elevated along the course of the sternomastoid muscle. (b). Upper end used for reconstruction of nasal tip. Disadvantage of this tube is that it leaves conspicuous scarring on the side of the neck.

as well as elsewhere on the body, should make it obvious that no single flap is capable of correcting every type of defect. Each group of flaps has certain advantages and disadvantages, and each flap in itself has one or more specific purposes. The selection of a flap for any individual patient depends on the size, shape, and location of the defect; also, age, sex, and general physical condition of the patient; the length of time required to complete a plastic procedure with various flaps; the patient's financial status; the condition of the tissues around the defect; and the condition of the tissues at various donor sites. All of these factors influence the selection of a flap, but, obviously, the method of preference should offer the most effective aesthetic and functional result in the shortest possible time.

For a small loss of tissue on the nose, contiguous flaps offer the quickest method of repair. Moreover, their color and texture are the same as those of the rest of the nose, since they are derived from the tissues adjacent to the defect. However, contiguous flaps have a limited degree of usefulness, since they can be employed only for small perforations or skin losses on the nose and can be elevated only in tissues which have not been badly irradiated and which are not excessively scarred. In defects which are too large to be corrected by contiguous flaps and for all larger defects ranging up to complete loss of the nose, the use of forehead flaps always can be considered unless the skin over the frontal region is scarred. Forehead flaps require less time in preparation, are less likely to slough, and are less difficult to prepare than any of the tube flaps. Moreover, forehead flaps give excellent cosmetic results because the color and texture of the skin are similar to the dermal covering of the nose. Unfortunately, forehead flaps have one distinct disadvantage which has brought me to



Fig. 12. Reconstruction of nose with a pedicle arm flap. This type of flap is elevated and transferred in two stages. However, skin in this region is not very satisfactory for nasal reconstruction.

the point of almost discontinuing their use. This disadvantage is the rather conspicuous scarring at the donor site on the forehead. This is not so important in women who can style their hair to cover the scar, but in men it is undesirable.

In my experience in the last few years, I have found that an excellent nasal reconstruction can be created with a clavicular-tube flap, the upper end of which has good color and texture. The great advantage of a clavicular tube lies in the fact that the scarring at the donor site is not visible when the patient is clothed. The only real disadvantage of a tube flap is that a longer period is required to complete the nasal reconstruction than is necessary with a forehead flap. Consequently, only in patients who are not concerned with a scarred forehead and who want the reconstruction done as quickly as possible do I use a forehead flap. Otherwise, at present, I prefer a clavicular or chest-tube flap. This, of



Fig. 13a. Recurring basal cell epithelioma on bridge of nose. (b). Lesion excised and covered by contiguous flap rotated from the glabellar region. (c). Postoperative result.



Fig. 14. Simple rotation of contiguous nasal flap for repair of small perforation. (a). Flap is elevated, lined with a skin graft, and sutured back in place. (b). Two weeks later, the flap is elevated, advanced, and sutured around defect. (c). Final result.

course, holds only if the dermal tissues over the clavicular region or chest are not scarred and elevation of a tube flap of skin is not prohibited because of scarring. In regard to a clavicular tube, I have found that the skin in the supraclavicular region is the most desirable for nasal reconstruction. To obtain skin from the supraclavicular region necessitates construction of a tube in an oblique direction across the clavicle (figure 10a). Bending the patient's head down and to the side enables the surgeon to fasten the upper end of the clavicular tube directly to the nose without first attaching the outer end of the flap to the neck as an intermediary stage.

PARTIAL DEFECTS OF THE NOSE REPAIRED BY CONTIGUOUS FLAPS

Small perforations of the nose and other insignificant losses of nasal tissue can often be repaired most easily and satisfactorily by use of a contiguous pedicle flap of skin. Whether or not this method of reconstruction is desirable depends upon the condition of the tissues adjacent to the defect. If much irradiation over the nose has resulted in actinodermatitis or if the adjoining tissues are scarred, use of a contiguous flap is inadvisable. Otherwise, contiguous flaps should be seriously considered for repair. In some instances, a small surface defect can be corrected by a contiguous flap which is advanced over the defect (figures 6 and 13). However, such a flap must be made very large in order to permit a smooth reconstruction (figure 14). The scar from a large contiguous flap often results in a more conspicuous repair than would occur if a full-thickness skin graft were applied to the denuded surface. No flap should be inlayed into a defect. On the contrary, it should be large enough to extend beyond the margins of the defective part. If the flap is merely inlayed into a defect, the margins of repair may become constricted; the

reconstructed part may pucker; and the cosmetic result may be poor (figure 15).

A defect involving loss of tissue along the lateral edge of the nostril often can be repaired with a contiguous flap of skin elevated just above the defect (figure 16). The upper edge of the healed defect forms the pedicle of the flap, which, at the first operation, is completely elevated and sutured back in its bed. Delay in transference to the defect insures a good blood supply in this small flap. Two weeks after the first operation, the flap is elevated, turned down, and folded on itself; the turned-over portion forms the free border of the nostril. After the lateral margins of the defect are freshened, the folded flap is sutured in proper position. This process of transferring the flap to the defect leaves an irregular raw surface on the side of the nose, which is covered with a full-thickness skin graft from behind the ear. This procedure provides a rapid and effective means of repair.

Small, completely healed perforations on the side of the nose are not uncommon and can be repaired nicely by means of a contiguous-skin flap, which acts as a lining and a full-thickness skin graft for a covering (figure 17). A small, semicircular flap is elevated adjacent to the perforation and is turned with its raw surface up into the defect. Subsequently, the mucous membrane at the margins of the defect and the edge

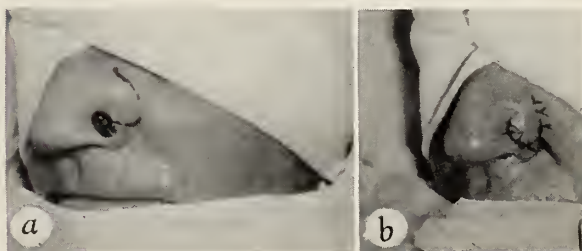


Fig. 15a. Small defect in the skin on left side of nose. (b). Corrected by small contiguous flap. See text.

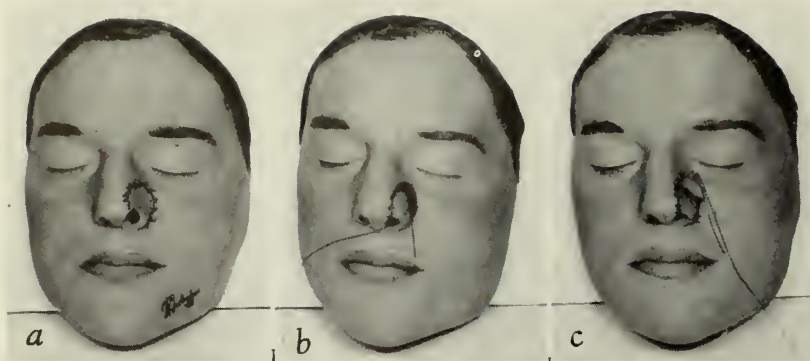


Fig. 16. Nasal skin flap and full-thickness skin graft for repair of small defect of nostril. (a). Flap left attached along lower border is elevated and sutured back. (b). Two weeks later, skin is elevated, turned down, and folded on itself to form lower border of the nostril. (c). Irregular raw surface on side of the nose is inlaid with a full-thickness skin graft from behind the ear.

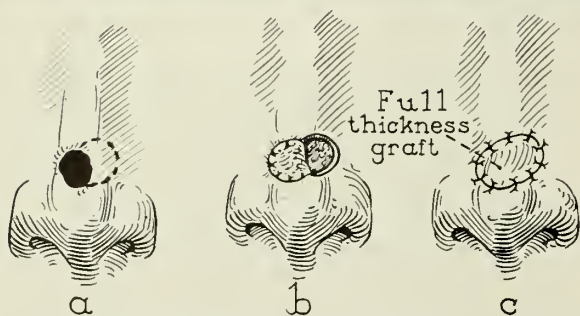


Fig. 17. Nasal skin flap and full-thickness skin graft for repair of small perforations of nose. (a). Flap with pedicle along defect is elevated. (b). Flap is turned over and sutured down around edges of the defect to form a lining. (c). A full-thickness skin graft is obtained from behind the ear and is inlaid into defect and over the flap.

of the flap are sutured together. A full-thickness skin graft from behind the ear forms the epithelial covering.

Some small perforations involving the side of the nose can be repaired at times by simple rotation of a contiguous flap (figure 14). Such a flap requires an epithelial lining. For this purpose, a shave-skin graft is attached to the under-surface of the flap ten days to two weeks before it is transferred over the nasal perforation. However, I believe that the majority of small nasal perforations are repaired more easily and satisfactorily by means of a contiguous flap turned over as a lining and a full-thickness skin graft as a covering than by the simple rotation of a contiguous flap.

PARTIAL DEFECTS OF THE NOSE REPAIRED BY NEIGHBORING AND DISTANT FLAPS

A simple, ribbonlike flap of skin elevated along the nasolabial fold of the cheek can be employed to repair minor defects involving the edge of the nostril or the lower lateral part of the nose (figure 18). Such a flap should be used, however, only for elderly individuals whose skin is loose and wrinkled about the face. Under these circumstances, the flap can be elevated and trans-

ferred, and the donor site can be closed by suturing without any permanent distortion of the tissues at the angle of the mouth. If the flap is properly planned, the scar produced by the suture line at the donor site is almost invisible because it is located in the normal nasolabial fold.

If the portion of the lost tissue is large but the loss is not complete or if the surrounding tissues are badly scarred, a contiguous flap cannot be considered. Accordingly, a forehead flap or a tubed graft must be used. As previously mentioned, I employ a sickle-shaped temporal flap, a loop-shaped supraorbital flap, a vertical-forehead flap, or a clavicular tube flap. As was described heretofore, the forehead flaps do supply the skin with an excellent color and texture. They have a good blood supply and consume less time in preparation than do the tube flaps. However, because they produce scars on the forehead, I do not favor their routine use. In-



Fig. 18. Pedicle flap from the cheek for small defect of nostril of an elderly individual. (a). Flap is completely elevated except for upper and lower attachments. Two weeks after first elevation, lower attachment (pedicle) is cut across and sutured. Two weeks later, flap is transferred, folded along its long axis and sutured in order to make the lower border for the nostril. (b). Three weeks later, flap is cut off close to the nose and unused part is returned to the cheek.

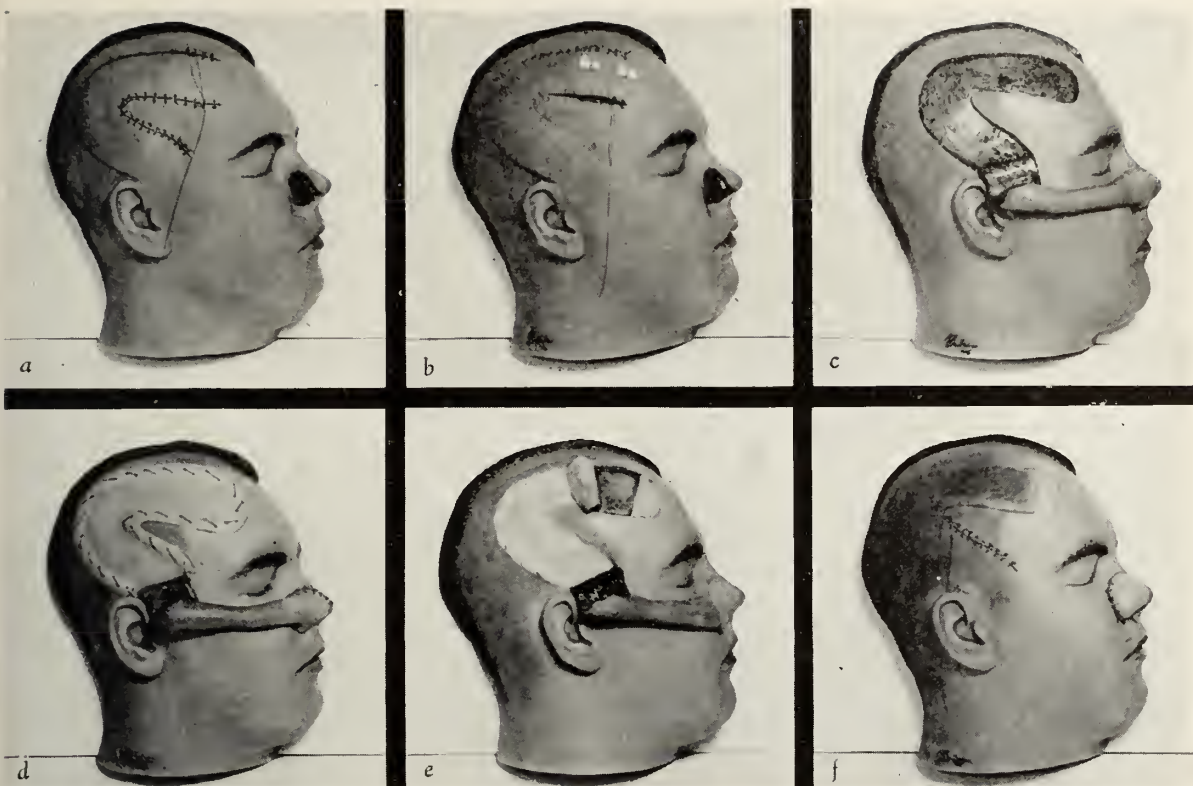


Fig. 19. Sickle-shaped temporal flap. (a). The flap, which includes the superficial temporal artery, is completely elevated except for attachments in the temporal and frontal regions. It is sutured back in its original position. (b). Two weeks later or during the first operation, that part of the flap which will cover the defect must be lined with a shave-skin graft. Skin graft is inserted with raw surface up under flap and sutured in position. Under a firm pressure dressing for ten days, the skin graft heals to undersurface of the flap. (c). Two weeks later, flap is elevated and brought down so that its distal portion may be properly folded and sutured around the defect. (d). Denuded surface on scalp is covered with a shave-skin graft. The flap itself is wrapped in paraffin gauze to protect the eye from hairs which grow from the hair-bearing part of the flap. (e). Three weeks later, flap is severed from the reconstructed part and returned to the scalp. A part of the shave-skin graft is removed so that the unused part of the pedicle can be returned to its original bed on the scalp. (f). Unused part of the flap has been returned to the scalp, leaving only a small part of the shave-skin graft visible on the forehead.

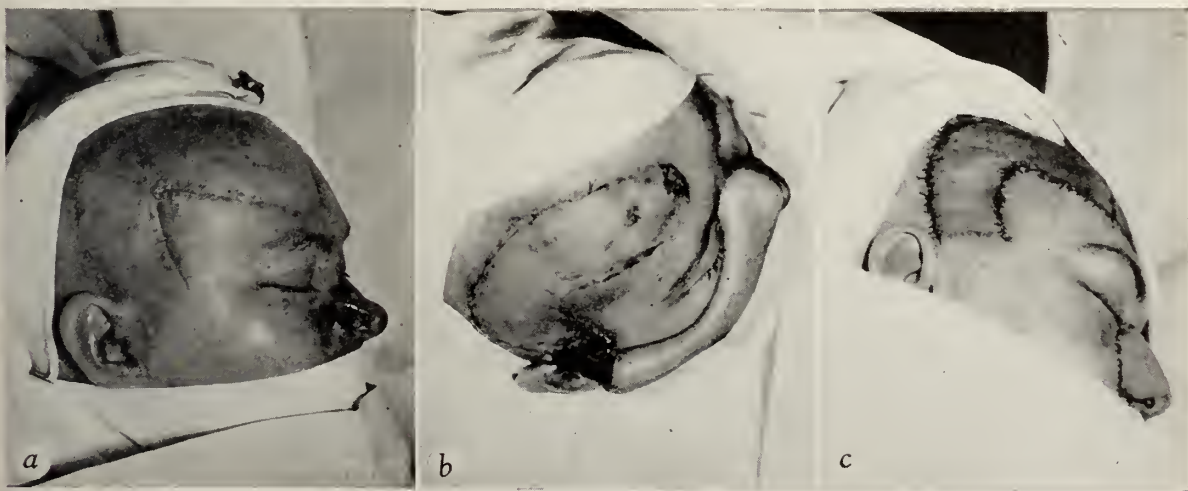


Fig. 20a. Postoperative loss of left ala and left lower border of nose. Repair of defect was accomplished by means of a sickle-shaped temporal flap. (b). Temporal flap transferred to defect. Resultant denuded surface in temporal region has been covered with shave-skin graft from abdomen. (c). Nasal defect repaired. Unused part of sickle-shaped flap has been returned to scalp.

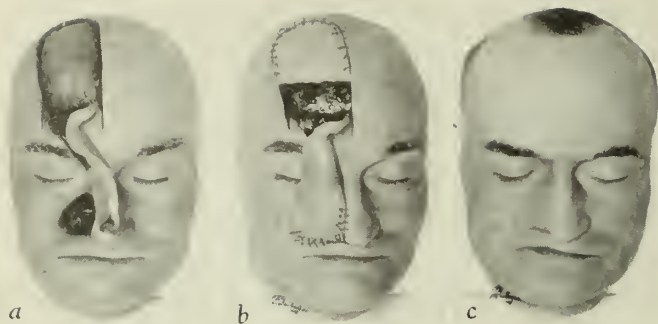


Fig. 21. Vertical, supraorbital flap. (a). This flap has been elevated and lined with a shave-skin graft. Two weeks later, entire flap is elevated and transferred to defect on right side of nose and cheek. (b). Flap is sutured down in position and a shave-skin graft is applied to denuded surface on forehead. (c). Three weeks later, unused portion of the pedicle flap is detached from the reconstructed part and returned to the forehead.

stead, I prefer the cervical-tube flap, which leaves no visible scar at the donor site when the patient is clothed.

A sickle-shaped temporal flap (figures 19 and 20) is an effective method of reconstructing partial defects of the nose and leaves less residual scarring than any of the forehead flaps. The stages in elevating and transferring this flap are illustrated in figure 19. A free-skin graft, which is placed on the undersurface of the distal end of the flap (figure 19b), is frequently used for lining in rhinoplastic work. If the flap is intended to reconstruct the lower lateral border of the nose, the distal edge of the flap should be turned under to produce the free edge of the nostril. In many instances, the unused part of the flap, when returned to the donor site, stretches to such an extent that only a small portion of the free shave-skin graft covering the donor surface is needed (figure 19f). When the flap has been transplanted to the defect, it is important to wrap the pedicle in Vaseline or paraffin gauze to protect the eye from hairs growing out of the flap (figure 19d). The only partial defect of the nose that should not be repaired by a sickle-

shaped temporal flap is loss of the lower third of the nose, which requires the flap to be brought straight down. In the case of a sickle flap, the pedicle approaches the nasal defect from the



Fig. 23a. Postoperative loss of most of nose. (b). Nose reconstructed with loop-shaped supraorbital flap.



Fig. 22a. Postoperative defect of nose due to removal of an epithelioma. (b). Vertical flap from center of forehead turned down to cover defect. (c). Postoperative result after repair of nasal defect. Donor area is sutured in midline rather than covered with shave-skin graft.



Fig. 24a. Large epithelioma on tip of nose. (b). Defect after removal of the lesion. (c) and (d). Loop-shaped supra-orbital flap brought down for nasal reconstruction. (e). Nose following return of unused part of forehead flap to the forehead. Nose is allowed to shrink for two or three months after which excess fat is removed and contour of nostrils corrected. (f). Postoperative result.

side, which tends to pull the reconstructed part of the nose laterally. This is undesirable from a cosmetic standpoint.

When the lower third of the nose is to be reconstructed by means of a forehead flap, the loop-shaped frontal flap is ideal for this purpose. The use of this flap for such a defect is similar to total rhinoplasty and this procedure will be discussed later.

A vertical flap on the forehead, whether elevated in the center of the forehead or over one brow, offers the most rapid method of correcting defects involving the side of the nose (figure 21). Unless the patient is bald, the length of such a flap is limited and, consequently, can be used only for defects of the upper half of the nose. Furthermore, it frequently leaves conspicuous scars on the forehead, and I do not recommend it except for individuals who want their nasal defect repaired as quickly as possible and who are not concerned with residual forehead scars (figure 22). A vertical-forehead flap usually requires a lining if it is to cover a perforation. A shave-skin graft can be inserted for this purpose under the flap at the first operation. Two weeks later, the flap can be elevated again and turned down to cover the defect. In three weeks,

the unused part of the flap can be returned to the forehead.

I believe that a clavicular-tube flap offers an excellent means of repairing partial defects anywhere on the nose. If such a tube is raised obliquely across the clavicle (figure 10a), the upper end is devoid of hair. If the tube is sufficiently long, it will reach directly to the nose. In women, I frequently elevate a clavicular tube just below the clavicle to prevent residual scarring in the supraclavicular regions. One month after the tube flap has been elevated, the upper end is cut partially across to cut off half the blood supply from the upper end and to stimulate the vascular supply at the lower mesial extremity. Ten days later, the entire upper end is detached and transferred to the defect on the nose. In three weeks, the unused part of the tube can be cut off and discarded.

Only when the forehead, clavicular regions, and chest are badly scarred would I consider using an arm, subaxillary, thorax-to-wrist, or abdomen-to-wrist flap for reconstruction of partial defects of the nose. The skin forming such flaps is too white from the aesthetic standpoint, is often too thin, and is generally rather poor material for repair of lost nasal tissues.

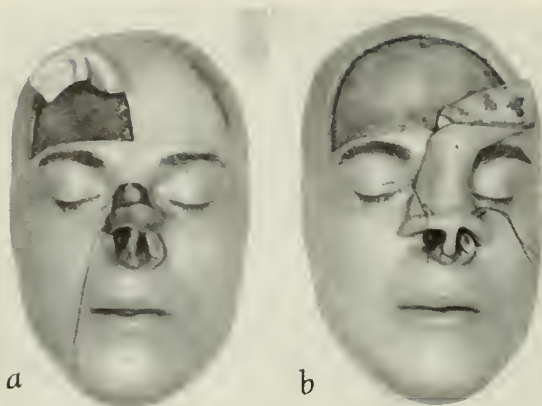


Fig. 25a. Method of folding the free edge of a forehead flap to form the columella and nostrils. When the defect does not involve the bridge of the nose, the flap need not be lined with skin; the skin over the nasal bridge can be turned down for a lining. (b). Loop-shaped supraorbital flap brought down for nasal reconstruction.

TOTAL LOSS OF THE NOSE

For total nasal reconstruction, a loop-shaped forehead flap, a clavicular-tube flap, or a chest-tube flap (figures 23 and 24) may be employed. The color, texture, and thickness of the skin over the forehead are perfectly adapted for building an entire nose. However, in recent years, I am inclined to use a tube flap from the clavicular region or chest from which a satisfactory nose can be constructed because it leaves no visible scarring when the patient is clothed.

The stages in elevation and transplantation of a loop-shaped supraorbital flap are shown in figure 8. The free edge of the distal portion of the flap is folded to form the columella and nostrils as illustrated in figure 25. By this process of folding the flap on itself, the lower half of the newly constructed nose is lined with skin. Whether or not the upper half of the reconstructed nose must be lined with skin depends on the size of the nasal defect. If the defect extends up toward the glabella, then that portion of the flap forming the upper half of the reconstructed nose

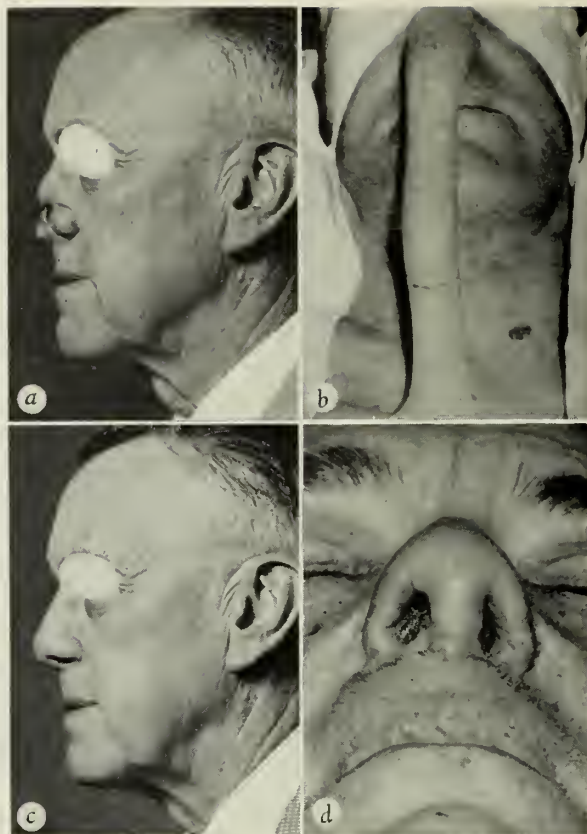
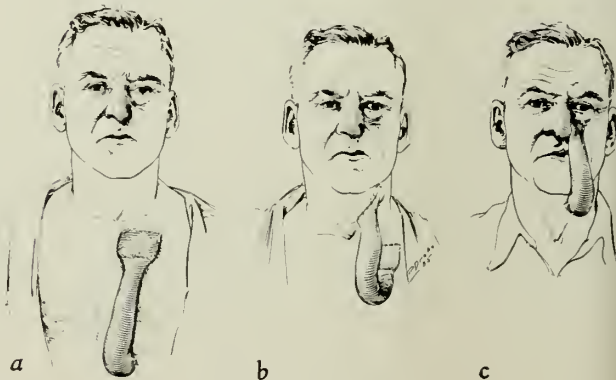


Fig. 26. Epithelioma of the nose. (a). Postoperative defect. (b). Clavicular-tube flap employed to reconstruct nose. After unused part of tube flap is detached, nose is allowed to shrink for two or three months, and then excess fat is removed to give it a better contour. (c) and (d). Final result.

must be lined with a shave-skin graft. This free graft is applied to the undersurface of the flap during the first stage of its elevation. Frequently, patients who have lost only the lower half of the nose have some normal skin over the bridge which can be turned down as a flap to form a lining for the upper half of the reconstructed nose.

If a tube flap is to be used for total rhinoplas-

Fig. 27. Use of upper end of a thoracic tube flap for nasal reconstruction because of more satisfactory color. (a). Upper end of tube flap is lined with a shave-skin graft. This is indicated by dotted area. (b). Later, lower end is detached from chest and sutured to the midcervical region. (c). When this has healed after three or four weeks, upper end of tube is cut across and elevated to the nasal defect.



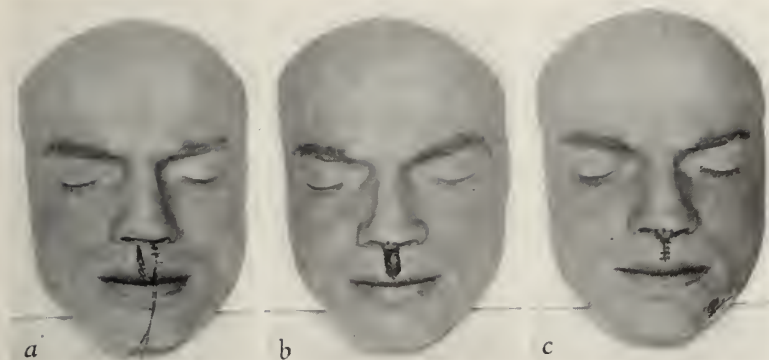
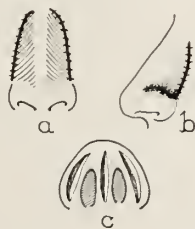


Fig. 29. Pedicle flap of skin from upper lip to repair lost columella. (a). Flap is elevated from upper lip except for an attachment above. It is lined with a postauricular full-thickness skin graft and sutured back. (b). Two weeks later, flap is elevated again, turned up, and free end is sutured to tip of nose. Flap and skin graft are sutured along sides. Defect on lip is sutured. (c). Final result. This method is usually a poor way of reconstructing the columella. See text.

ty, I prefer the clavicular type if it can be made wide enough for the necessary reconstruction (figure 26). Otherwise, I use a chest-tube flap, attaching the lower end of the tube to the side of the neck as an intermediary stage and using the upper end of the tube, which is a better color, for the nasal repair (figure 27).

A reconstructed nose should be made somewhat larger than necessary to allow for subsequent shrinkage. In three to six months after

Fig. 28. Some procedures employed to improve contour of a reconstructed nose. (a). Incision to remove excess lateral subcutaneous tissue in order to produce a narrow bridge and make the alae stand out. It is often necessary to shorten the nose by excising a crescent-shaped piece of tissue from upper part of reconstructed portion of nose. (b). Two weeks later, a lateral incision is made to form a sulcuslike depression just above the alae and to remove subcutaneous tissue from lateral part of the nose. (c). Two weeks later, removal of elliptical pieces of skin and subcutaneous tissue from columella and either ala in order to narrow these parts.



rhinoplasty has been completed, the excess fat can be excised to effect a better contour. The method which I employ for removing excess fat is illustrated in figure 28.

In some instances, the bridge or tip of a reconstructed nose lacks adequate support and must be upheld with an implant of costal cartilage or bone. For this purpose, I usually prefer a piece of bone taken from the crest of the ilium. Removal of the cortex from this block of iliac bone leaves a piece of cancellous bone, which is easily shaped to required dimensions with files and rongeurs. Moreover, it heals into place quickly and does not warp as costal cartilage does at times.

LOSS OF THE COLUMELLA

Loss of the columella offers a rather difficult problem in plastic repair. All sorts of flaps have been designed to reconstruct this anatomic part of the nose. One method, often described in the literature, makes use of a little pedicle flap elevated on the upper lip. This flap is lined and turned up to form the columella as illustrated in figure 29. Some surgeons recommend prepara-

Fig. 30a. Epithelioma of lower end of nasal septum and columella. (b). Defect after removal of epithelioma. (c). Reconstructed columella. Clavicular tube flap was employed for this purpose.



tion of a tiny tube flap in the lower part of the neck, the tube being migrated up to form a columella. In my experience, both of these methods present two undesirable features: First, the reconstructed columella is so small and narrow that it has an unnatural appearance. Second, these small flaps are likely to slough before the columella can ever be completed. I believe that the only really satisfactory technic for building a columella is to use a clavicular-tube flap (figure 30). This makes a large reconstruction, which eventually can be trimmed down to produce a columella of normal proportions. The

only disadvantage of a clavicular-tube flap is the great amount of tissue that must be elevated and wasted in order to obtain the relatively small amount of tissue needed for columellar repair.

Figures 6, 7, 8, 9, 10, 12, 14, 21, 23, and 27 are reprinted from ERICH, J. B.: Traumatic defects of nose and cheek. *S. Clin. North America* 1009-1029 (Aug.) 1949. Figure 19*c, d, e, and f* is reprinted from ERICH, J. B.: Cancer of the nose: treatment and plastic repair. *Laryngoscope* 59:839-857 (Aug.) 1949. Figure 28 is reprinted from NEW, G. B.: Total rhinoplasty using a forehead flap. *Tr. Am. Soc. Plast. & Reconstruct. Surg.* 33-42, 1944.

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IN SELECTED PATIENTS, conservative treatment of nontoxic nodular goiter is justified. Risk of death from thyroid cancer among conservatively treated patients is probably less than the operative mortality would be if all goiter nodules were removed.

Current criteria for selection of patients for surgery are apparently fairly reliable. Enlarging, firm, discrete tumors of the thyroid must be removed, as must nodules producing distinct pressure symptoms. Soft, smooth, round nodules which are not enlarging may be left alone. Among older patients, irregular, partially calcified masses which have not changed for some years may also be conservatively managed.

Of 140 patients with conservatively treated nontoxic nodular goiter seen between 1921 and 1945, only 1 later had thyroid cancer. In contrast, 16 per cent of 156 surgically treated patients had cancer.

A reasonable period of observation to determine whether or not a nodule is enlarging is almost always justified. Nodules appearing during pregnancy may regress spontaneously. Desiccated thyroid or iodine may produce satisfactory results in other instances. Since the prognosis in thyroid cancer depends principally on the biologic characteristics of the tumor, the physician may take several months to decide whether surgery is necessary.

JOSEPH E. SOKAL, M.D., Yale University, New Haven Connecticut. *Arch. Int. Med.* 99:60-69, 1957.

Treatment of Some Common Peripheral Vascular Disorders

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ONLY IN RECENT YEARS has the specialty of peripheral vascular disorders received the recognition its importance warrants. With this changed attitude, interest has been aroused in the study of the mechanisms responsible for the various conditions falling into this category and in the formation of a proper therapeutic approach to the problem. This paper deals with a discussion of therapy used in 3 of the most common peripheral disorders: arteriosclerosis obliterans, varicosities, and stasis ulceration.

ARTERIOSCLEROSIS OBLITERANS

Because of the progressive lengthening of life expectancy, particularly of the diabetic patient through the use of insulin and diet, we may anticipate that the incidence of atherosclerosis will continue to rise. Therefore, more emphasis should be placed on the early recognition and treatment of this most common occlusive arterial vascular disorder.

Local care of the extremities. Proper care of the involved limbs is of great value in the prevention of ulcers and gangrene. Since this aspect of therapy is primarily the responsibility of the patient, the physician must explain in detail the reasons for the various steps and the possible serious consequences of neglecting them. A printed or mimeographed list of directions, similar to the one presented in table 1, may help remind the patient of his role in the treatment program. Some of the points enumerated in the table will be elaborated upon later.

Protecting the feet from noxious stimuli and trauma is of paramount importance. In the winter months, the lower extremities should be kept warm with woolen socks and full-length woolen drawers, and exposure of the body to cold should be reduced to a minimum. If there is any possibility of sustaining injury to the limbs during the course of daily physical activity, the patient should seriously consider changing his occupa-

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TABLE 1

GENERAL DIRECTIONS FOR HOME CARE OF THE FEET

1. Wash feet each night with face soap and warm water.
2. Dry feet with a clean soft rag *without* rubbing the skin. Dry carefully between the toes.
3. Always keep feet warm. Use woolen socks or wool-lined shoes in winter and white cotton socks in warm weather. Use a clean pair of socks each day.
4. Use loose-fitting bed socks.
5. Never apply hot water bottles, electric pads, or any other form of mechanical heating device to the extremities.
6. Wear properly fitting shoes and be particularly careful that they are not too tight. Use shoes made of soft leather.
7. Cut toenails in a very good light and only after soaking feet in warm water and cleansing thoroughly. Cut toenails straight across. Do not cut down in corners of the nails. If feet are taken care of by a chiropodist, be sure to tell him of the difficulties.
8. Do not cut corns or callouses. Never use corn plasters or corn medicine. Instead, take pressure of shoe off corns, bunions, or callouses, using pads or larger shoes.
9. Do not wear circular garters.
10. Do not use strong antiseptic drugs on the feet, particularly tincture of iodine, Lysol, or carbolic acid.
11. Seek medical care at first signs of a blister, infection of the toes, ingrowing toenails, or trouble with bunions, corns, or callouses.
12. Do not use tobacco in any form.
13. Have feet examined by some member of the family at least once a week for blisters, sores, or other wounds.
14. Avoid getting athlete's foot. If present, be very careful in treating it. Seek a doctor's advice on the matter.

From: *Diagnosis and Treatment of Peripheral Vascular Disorders*, by DAVID I. ABRAMSON. New York: Paul B. Hoeber, Inc., 1956.

tion. Shoes reinforced with metal covering on the tip may, in some instances, be necessary in order to protect the toes from injury.

The patient should never attempt to treat ingrowing toenails, corns, callouses, or bunions but should consult a physician or chiropodist who is aware of the patient's significantly reduced circulation. Surgical treatment of these conditions should be avoided as much as possible, for an improper approach may lead to ulceration and gangrene.

The patient must be impressed with the fact

that the direct application of dry or moist heat is fraught with danger and that such an approach may initiate burns, leading to ulcers and gangrene. The physician, too, should never use direct heat in any form in the treatment of inflammation superimposed upon an ischemic ulcer or gangrene.

Physical activity. Since intermittent claudication is a frequent finding in arteriosclerosis obliterans, the question arises of how much exercise is safe for the patient. As a general rule, he should be advised to learn the range of effort that is possible without producing symptoms and stay within it. However, there is no objection to graded exercises in the hope that the load placed locally on the vascular tree will act as a stimulus for a more rapid growth of collateral vessels. In discussing the matter with the patient, it should be stressed that intermittent claudication produces no serious consequences and that it acts only as a deterrent to normal walking. At no time should a life of physical inactivity be adopted, for this leads to disuse, atrophy of the muscles of the lower extremities, and further impairment of walking.

If the patient finds that he is unable to carry out his daily chores in an efficient manner because he has to stop frequently, he should attempt to make some simple readjustments to his disability. He will soon find that if he reduces his usual pace, he will be able to walk a longer distance before experiencing pain. A cane may be useful in order to decrease the weight placed on the involved extremity. Walking stiff-legged also increases the claudication distance, provided the symptoms are present in the calf muscles.

Abstinence from smoking. Since smoking tobacco causes vasoconstriction of cutaneous vessels, it is advisable for the patient to abstain from this habit in order to maintain the cutaneous circulation at the highest possible level of efficiency. However, progress of the disease that is noted in thromboangiitis obliterans from smoking does not exist in the case of arteriosclerosis obliterans.

Treatment of ischemic neuritis. Since ischemic neuritis is frequently present in advanced cases of arteriosclerosis obliterans, its treatment must be considered. Of possible value are intramuscular injections of vitamin B₁₂ (50 or 60 µg. two or three times a week), large doses of orally administered thiamine chloride (200 mg. three or four times a day), and intramuscular injections of crude liver extract (1 cc. two or three times a week). If improvement occurs, it will be noted only after a prolonged period of therapy. A useful adjunct is elevation of the head of

the bed about 6 to 8 in. in order to increase arterial blood flow to the lower extremities during sleep.

Sympathectomy. Considerable controversy exists regarding the role of sympathectomy in arteriosclerosis obliterans. Since most of the experimental data support the view that sympathetic innervation of muscle blood vessels is negligible, there appears to be little physiologic basis for removing this control in the treatment of intermittent claudication, for this symptom is caused by an inadequate muscle circulation during periods of work.

On the other hand, there is no doubt that sympathectomy may be of value in the presence of ulceration, since it causes a significant vasodilatation of cutaneous vessels. It may also contribute to a successful outcome after amputation of a gangrenous toe, although it should not be used when the destructive process is widespread and has extended onto the adjoining portion of the foot.

On the basis that the resulting improvement in cutaneous circulation would make the limb less vulnerable to infection and trauma, the question arises as to whether sympathectomy is worthwhile as a prophylactic procedure in the prevention of nutritional disturbances. However, there is no available clear-cut, extensive, and long-range clinical study of patients with arteriosclerosis obliterans to indicate that there is a statistically significant reduction in the incidence of trophic changes in sympathectomized extremities, as compared with a comparable group of nonoperated patients.

Treatment of ulceration or gangrene. In the presence of nutritional changes, the therapeutic goal is the prevention of spread of the destructive process to normal tissue, the facilitation of demarcation of nonviable from viable structures, and the healing of the denuded areas after spontaneous or surgical removal of necrotic material.

Control of secondary infection is of prime importance in the preservation of the limb. It must be pointed out, however, that to achieve this through parenteral administration of antibacterial agents is difficult, since the reduced local circulation interferes with the effective build-up of a potent concentration of the drugs in the tissues. Nevertheless, this approach is still advisable. By means of sensitivity studies on cultures obtained from the lesion, the indiscriminate and blind use of antibacterial agents is minimized, and, at the same time, the antibiotics most capable of controlling the infection are determined.

In regard to local treatment, a topical medica-

tion must be carefully chosen so that no deleterious effect upon the tissues will follow. In the presence of large quantities of secretion and pus, daily soaks should be used in order to keep the wound clean. After each treatment, close attention must be paid to drying the entire limb carefully, particularly between the toes. If necrotic tissue partly or completely covers an ulcerative area, this material should be removed before applying any topical medications. Of value in this respect is the daily application of Dakin's solution, Azochloramid in oil, or a solution of Tryp-tar or Varidase.

If infection is minimal, while the predominant change is local death of tissue limited to a toe or toes, a conservative attitude should be assumed in the hope that spontaneous demarcation and amputation may take place. Removal of necrotic tissue which has become loosened is also indicated. At no time, however, should any normal tissue be excised. Until healing occurs, the area should be kept covered by sterile bandages.

After the necrotic tissue has been removed and infection is controlled, the next step is the topical application of substances which may accelerate the healing process, such as White's A & D ointment, red blood cell powder (Lyocyte powder), and coal tar products (Daxalan ointment). Also, the ulcer should be cleaned and dressed less often, since repeated manipulation may cause injury to newly-formed blood vessels and thus inhibit the rate of epithelization.

The maintenance of the cutaneous circulation at a maximal state of dilatation also aids in healing ulcers. Among the medications that are useful for this purpose are whiskey and the various sympathetic blocking agents, such as Priscoline, Hydergine, and Dibenzyline. Another means of temporarily increasing the blood supply of the skin of the extremities is reflex or indirect vasodilatation, which is produced by the application of heat to distant portions of the body. As previously mentioned, sympathectomy has a similar, but relatively permanent, effect on cutaneous circulation.

PRIMARY VARICOSITIES

One of the most important diseases of the venous system and, at the same time, one of the most common of the peripheral vascular disorders is primary varicosities.

Indications for medical therapy. The medical treatment of this condition generally has only limited applications, since, at best, the various procedures alleviate rather than cure the underlying difficulty. However, this approach may be necessary, either as a temporary or permanent

measure, under conditions such as those found during pregnancy when varicosities may appear or, if already present, become more pronounced. Since they may tend to regress or even disappear after delivery, it is generally advisable to delay surgery and control the increasing distention of superficial veins with some type of compression bandage. Temporary medical therapy should also be considered in the presence of marked obesity and in cases of nonsymptomatic, minor varicosities, in order to determine whether the disease will progress.

Some types of individuals should continue to utilize medical methods for the control of their varicosities. For example, the patient in whom recurrences have taken place after several corrective operations is generally a poor subject for further operative procedures. Similarly, an associated occlusive arterial vascular disorder or a severe vasospastic state contraindicates surgery. There is also a question regarding the advisability of operative intervention for varicosities in the elderly patient who might respond unfavorably to a prolonged surgical procedure under general anesthesia.

Elastic compression. Compression and collapse of the superficial veins can be accomplished by the use of elastic stockings and bandages made of cotton and impregnated with elastic strands. The elastic stockings are the most widely used. They should be carefully fitted to the lower extremity and should cover the heel and a good portion of the foot up to the base of the toes. The length of the stocking depends upon the extent of the varicosities, although, in most instances, one which ends below the knee is adequate. A stocking which allows stretch in two directions and is composed of heavyweight material is preferable.

The simplest type of compression bandage is the commonly used Ace Bandage, 3 or 4 in. in width. It is applied over the entire foot, except for the toes, and is wound spirally around the ankle and leg up to the knee. There is no satisfactory way of applying the bandage above this level. The main disadvantage of an elastic bandage is that it rapidly loses its elasticity and must be replaced frequently. It is generally used as a temporary measure until the patient can be measured for an elastic stocking.

Injection technic. This procedure should be used only to a limited extent in cases showing minor involvement. It does not in any way alter the reflux of blood which is responsible for the varicosities, and, hence, as one set of vessels is obliterated, another becomes prominent as a result of blood being shunted into it. Furthermore,

since regurgitation continues, recanalization of the thrombosed veins occurs because of the constant back pressure. Injection technic does, however, have a definite place as a supplement to surgical therapy, since it can occlude channels which are still prominent after operation.

It is necessary to point out that the procedure is not without danger, for various types of allergic reactions to the sclerosing agent may occur. Moreover, there may be a pronounced degree of local chemical thrombophlebitis, which, at times, may extend into the deep, as well as the superficial, veins.

Surgical Therapy. In most instances, symptomatic varicosities of a moderate or pronounced degree should be treated surgically, especially if obvious signs of venous stasis are present. Obliteration of the main channels of the involved venous system may be accomplished by one of several procedures: (1) high ligation of the great saphenous vein at its junction with the femoral vein; (2) high ligation of the great saphenous vein followed by retrograde injection of a sclerosing agent into the distal portion of the vessel; (3) high ligation of the great saphenous vein at its junction with the femoral vein, together with multiple ligations and divisions of the vessel along its course; and (4) high ligation of the great saphenous vein and removal of part or all of this vessel by use of a stripper.

There is no general agreement as to which surgical procedure is most efficacious. However, vein stripping, although the most formidable, gives a better cosmetic result and is followed by more extensive thrombosis of the numerous perforating branches. Consequently, the possibility of recurrence is minimized.

STASIS ULCERATION

Stasis ulceration is one of the most serious complications of varicosities, as well as a relatively common sequel of deep thrombophlebitis. It frequently leaves the patient a semi-invalid, incapable of working for weeks and even months, and it is notorious for recurrences. The cause of the stasis ulcer in the lower extremity is venous stasis, which is due to interference with the movement of blood out of the limb. The resulting water logging of tissues, anoxia, impaired nutrition, and accumulation of waste products of metabolism reduce the resistance of the skin, and, as a consequence, a minor bruise, abrasion, or infection may be responsible for the formation of an ulceration. At times, this lesion may occur spontaneously. The medial and, less often, lateral aspects of the ankle are the sites of predilection for the stasis ulcer.

Prophylactic Measures. Of importance in the problem of stasis ulcer are the prevention and control of venous stasis. In the case of primary varicosities, surgical extirpation of the involved vessels is generally necessary, while, in deep thrombophlebitis, the same aim can be accomplished by instituting proper therapy early in the disease. Patients suffering from both disorders should be very careful to protect their lower extremities from trauma. Even a slight abrasion or laceration warrants several days of bed rest with the limb elevated. Also, the lesions should be handled very carefully with regard to asepsis.

Active therapy. Treatment of an ulcer may be divided into 4 phases:

1. *Steps to control venous stasis.* Of great importance in the treatment of an ulcer is complete bed rest with elevation of the involved extremity to facilitate venous outflow. At home, this is best accomplished by raising the two distal supports of the bed 6 to 8 in. on blocks of wood, bricks, or books. If the patient is unable to be in bed, either at home or in a hospital, some type of tight compression to the limb must be substituted, such as an Ace Bandage, a pure gum rubber bandage, an elastic stocking, a compression legging, or a nonelastic support like an Unna boot. Before putting on elastic supports, it is worthwhile to place a piece of sterile sponge rubber, cut slightly larger than the general outline and depth of the ulcer, over the lesion.

In all cases of varicose ulcers, surgical obliteration of the involved veins is eventually necessary. However, it is probably better to delay this step until the lesion is clean and infection has been controlled. Whether ligation of the femoral vein below the junction with the deep femoral vein is of advantage in treating ulcers in longstanding postphlebotic syndrome is debatable.

2. *Steps to control secondary infection.* Before an ulcer can be expected to heal, infection must be eliminated. This can be done most effectively if the patient is in bed. If the lesion is covered by necrotic tissue, it must first be removed. In the presence of a firmly adherent eschar, which cannot be separated without causing pain, attempts should be made to dissolve the connecting strands by means of such substances as Dakin's solution, Azochloramid in oil, Varidase, or Tryptar. When this is accomplished, the ulcer is then debrided. If the base appears to be grossly infected, it is worthwhile to perform sensitivity studies on the bacteria in the secretion in order to determine the proper antibacterial agents for parenteral and topical use.

Of great value in the treatment of an infected

ulcer is wet heat, which, of course, can be used only if the arterial circulation is adequate. For easy application, the ulcer should be covered with sterile gauze and the leg and foot wrapped in turkish towels previously dipped in hot water and wrung almost dry. In order to prevent loss of heat, the towels are covered with waxed paper, oiled silk, or some other impervious material. They are kept warm by the use of a heat cradle or a heat lamp, the intensity of the heat being regulated by the patient. In order to prevent maceration of the skin by the water, the heat is applied for periods of three hours, alternating with one-hour intervals during which the dressings are removed, the leg is dried, and the ulcer is covered with a fresh piece of gauze.

3. *Steps to accelerate growth of subcutaneous tissue and skin.* After infection has been controlled and the base of the ulcer is covered by clean granulation tissue, it is advisable to use substances which may stimulate the growth of tissue and cause epithelization. Among these substances are chlorophyll ointment (Chloresium ointment), White's A & D ointment, gentian violet and other dyes, coal tar products (Daxalan

ointment), and red blood cell powder (Lyocyte powder). The coal tar ointments appear to have definite value in producing rapid epithelization, although some patients may react poorly to them. This is particularly true if many ointments have been previously used. Red blood cell powder is also helpful, since it apparently serves as a protective covering and possibly as a source of nourishment and stimulation of growth of granulation tissue and epithelial cells. It may at the same time act as a support for newly ingrowing capillaries.

If conservative therapy does not promote healing, it may be necessary to utilize such measures as radical excision of the lesion and surrounding indurated skin and subcutaneous tissue down to the deep fascia, followed by a split-thickness skin graft or a pinch graft.

4. *Attempts to increase cutaneous circulation.* Among the valuable measures that are used to increase cutaneous arterial blood flow are ion transfer with Mecholyl or histamine and sympathetic blocking agents, such as Priscoline, Hydergine, and Dibenzyline. On occasion, even sympathectomy may be useful.

SURGICAL CORRECTION of coarctation of the aorta is justified, but the operation should be performed only by experienced surgeons. The most common indications for surgery are hypertension and congestive heart failure. Aortograms should be made only when atypical lesions or serious associated defects are suspected. Associated lesions, such as patent ductus arteriosus, aortic valve deformity with insufficiency or stenosis, and aneurysmal dilatation of intercostal arteries, impair prognosis.

Mortality is greater among young and old patients than in the middle-aged group. In children under 1 year of age, fatalities increase if surgery is delayed even for a few days. Irreversible complications may also arise when surgery is deferred in older patients.

Total mortality among 1,601 patients with surgically treated aortic coarctations was 8.6 per cent. Heart failure, shock, pulmonary edema, and cardiac arrest or fibrillation were the most common causes of death. Careful preoperative investigation and avoidance of anoxia and acute hemorrhage may help to reduce mortality.

Disruption of the anastomosis accounted for 28 of 125 deaths during the first three postoperative months. Possibly, wound infections were responsible for 11 of these fatalities. Interrupted mattress sutures should not be attempted unless the surgeon is exceptionally capable. Direct suture of the arterial ends, rather than grafting, should usually be done. Subclavian aortic anastomoses should be avoided if possible.

Hemorrhage during surgery caused 16 deaths. This hazard can probably be lessened by operating before excessive dilatation and thinning occur and by taking meticulous care to avoid trauma.

Long-term results among 1,405 surviving patients were satisfactory in over 96 per cent.

Dis. Chest 31:468-478, 1957.

Age at Work—R for the Jobless Past 50

AGE IS NO HANDICAP at AGE; indeed, it is a prerequisite.

AGE, Inc.,—American Geriatric Enterprises—was created out of a St. Paul physician's concern for some of his older patients whose chief ailment he diagnosed as unemployment, which led to psychosomatic disorders untreatable by pharmaceutical prescription. Therefore, Dr. Kenneth R. Larson mixed his own anti-idleness prescription and labeled it AGE, Inc., a unique business institution that hires only workers between the ages 50 and 65.

Not a charity, but theoretically a profit-making enterprise, AGE is an incorporated business that provides employment for older, able-bodied men unable to find work because of industrial age barriers. Jobless through no fault of their own, because their company failed or consolidated, many older men become DW's, displaced workers, who have little money and much time—an excellent combination for breeding the imaginary illnesses that affect so many of our idle, older workers. However, with the help of AGE, these men can once more play their proper role in industry and the community. The men selected for employment at AGE include former shop foremen, machinists, woodworkers, carpenters, machine operators, and laborers—able-bodied men who ask no charity, only an opportunity to again become productive, useful citizens.

Before laying the foundation for AGE, Dr. Larson formed a committee of 30 and then, with the help of the State Division of Security and Unemployment, conducted a study which revealed that there were 1,500 unemployed men and women between the ages of 50 and 65 in St. Paul—more than enough reason to complete plans for the incorporation of the business. As a result of this study, it was decided by the committee that a survey should be made of many of the leading industries in St. Paul in order to determine what type of work could be obtained that people in this age bracket could do economically and efficiently. The committee raised \$1,500 to conduct this survey, and 7 different types of projects were very carefully studied. Then, in August 1956, AGE was incorporated and capitalized at \$25,000. The first meeting of the board of directors, consisting of 23 business and professional leaders, elected Dr. Larson as president and elected 8 other officers. AGE then rented an empty garage, hired several workers,

named as general manager Lewis C. Ross, a 72-year-old retired garment manufacturer, and went to work.

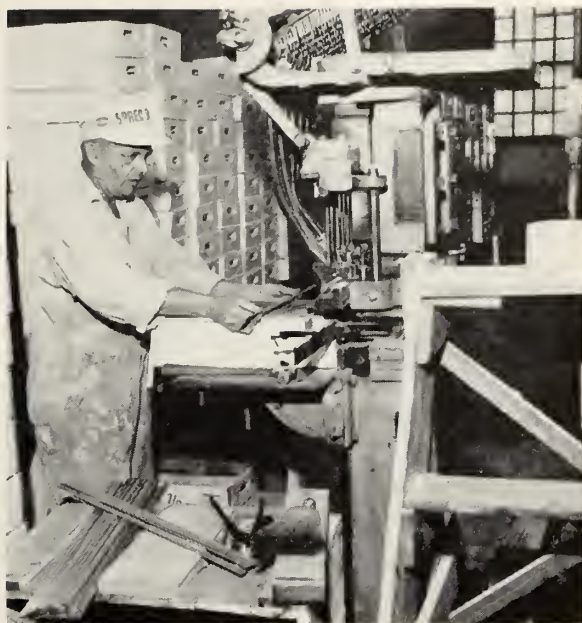
An early decision was to do contracting jobs for other companies—jobs which AGE might do cheaper than larger companies with a greater overhead and higher-paid help. The first contracts were for repairing, painting, and stenciling cases for soft drink bottles and for repairing and building wooden pallets used as platforms in industrial firms. Both types of contracts came from "friends" of AGE—sympathetic corporations that approved the project's efforts to help the older, unemployed worker. However, Dr. Larson emphasizes that the company gets and keeps contracts only because of its ability to meet competitive bids and deliver their "money's worth" to the customers.

The emphasis is on quality work performed by capable workers who could not find jobs in other industries, not because they were inefficient but because of artificial age barriers. These workers are usually victims of plant-wide shutdowns and include, for example, a former line foreman at Cudahy's Newport plant, a worker from the Twin Cities Arsenal, a cabinet maker, and an order filler from a wholesale firm which eliminated its grocery business. The first workers were recruited from applicants to the state employment service. Since then, the workers have been selected from the older unemployed men who regularly applied after they heard about AGE's hiring policy, which Dr. Larson hopes can be expanded to accommodate 100 workers. The employees work at tasks ranging from common labor to semiskilled, although some may have used higher skills in previous jobs. They are paid \$1.25 to \$1.50 an hour, which is considerably above the legal wage minimum. This liberal wage policy may have repercussions among organized labor circles who fear that the program might boomerang into a wage-cutting enterprise. However, union leaders are assuming a "wait and see" attitude before deciding how much the project's profit-making policy will affect other businesses.

The AGE factory stands today as a striking example of what can be done to help our older citizens regain and maintain healthy psychologic and physiologic standards. Of course, AGE is not without its problems. Projects must be found which require as much hand power as possible



This picture shows Lew Ross, the general manager, with Otto Kunde, aged 63, inspecting soft drink cases. Mr. Kunde is a cabinet maker who was out of work because his company went out of business. Mr. Kunde has 2 dependents.



Mel Whitaker, aged 53, is at the nailing machine replacing bands on cases that have been repaired and painted. Mr. Whitaker, a former mill worker, was unable to find work because of decreased activity in that industry. Mr. Whitaker has 1 dependent.



Shown with Dr. Larson is James Hoffman, aged 56, who is stenciling beverage cases. Mr. Hoffman worked for twenty-three years at the Cudahy Packing Plant and was unable to find steady employment after its local plant closed two years ago.

and, at the same time, bring income into the firm; equipment is expensive, and the original capital has dwindled since the company opened its doors; and overproduction looms large as a contingent obstacle. However, while AGE has its handicaps, it can pride itself on the brighter future it has opened for the unemployed older worker. Not only can its merit be measured in the immediate benefits afforded the idle senior citizen but also in the major contribution it is making to the cause of recognition and understanding of the problems of the aging. And, by providing positive proof that older workers are efficient and productive, AGE may well instigate a welcome open-door policy on the part of other industries which heretofore relied on indiscriminate age barriers as criteria for employment.

From a practical viewpoint, and one that every taxpayer will readily appreciate, during the first six months of their employment, the workers at AGE paid \$1,100 to the federal government in withholding taxes. During that same period of time, those who would otherwise have been on relief would have received at least \$3,600 in relief payments.

Thus, while AGE is still undergoing growing pains, the board of directors, made up of leading figures from St. Paul industry, and its president and founder, Dr. Larson, all of whom are voluntarily contributing their time and energy, feel confident that the prognosis is favorable for the future of St. Paul's youngest industry.

SINCE 1900, heart disease has become more than ever a disease of middle and old age, Health Information Foundation reports. Today about 70 per cent of all deaths from this disease take place at 65 years of age and over, and another 25 per cent between the ages of 45 and 64.

Disorders of the heart, blood vessels, and related organs caused over 850,000 deaths last year, which is more than half the total number of deaths in this country.

Heart disease is apparently more prevalent among women than men, Health Information Foundation points out. However, it causes 75 per cent more deaths among the males in this country. One possible explanation of the excess male mortality is the fact that men are thought to be particularly subject and vulnerable to the strains and pressures of modern life.

Nonpenetrating Abdominal Trauma

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NONPENETRATING ABDOMINAL INJURIES occur frequently and vary in severity from the trivial, inconsequential, and transient to the most extensive, disabling, and life-endangering. No abdominal injury is too slight to be neglected nor too extensive to be regarded as hopeless. The diligence with which effort is made to determine the presence of injured viscera and the thoroughness with which proper treatment is carried out determine the final outcome.

Exploration of the abdomen done soon enough to see what is injured, while the opportunity for surgical repair is yet possible, is better than the regret that accompanies an operation performed too late or a demonstration of repairable injuries at autopsy. It is necessary, therefore, to keep in mind injuries to the viscera when circumstances indicate such possibilities. Etiologic factors provide the circumstances.

ETIOLOGY

1. *Indirect trauma.* A sudden increase in intra-abdominal pressure without external violence may be responsible for abdominal injuries. Straining when defecating or urinating, vomiting, coughing, sneezing, lifting heavy objects, pulling, stretching, indulging in unaccustomed exercise, stumbling on or missing a step, and spontaneous or induced convulsions have been responsible for injuries to the abdominal wall or abdominal viscera.

2. *Direct trauma.* Kicks, blows, and falls, such as occur in sporting events, are responsible for injuries to the abdominal wall and the abdominal viscera. More important are those acts of sudden violence in automobile or other transportation accidents; the collapse of buildings and dwellings; and falls from scaffolds, ladders, or high windows. In industry, blunt trauma may be inflicted by the kickback from electric power saws or other mechanical devices. The "do it yourself" program started as a fad, but many inexperienced mechanics and engineers have injured

themselves abdominally from the devices with which they are unfamiliar. Patients with blast and crush injuries need careful study to rule out intra-abdominal injuries.

A history of trauma associated with any of the aforementioned factors should excite suspicion that an intra-abdominal injury has occurred. On suspicion alone, every patient with an abdominal injury should be held for observation even when initially there are no findings.

CAUSE OF DEATH

The causes of death from nonpenetrating abdominal injuries are hemorrhage, peritonitis, and the effects of concomitant injuries to the head, thorax, or the skeletal structures. In every instance of nonpenetrating abdominal trauma, complete physical examination of the patient is imperative to detect injuries elsewhere in the body. The failure to examine for other injuries is frequently responsible for neglect of injuries which may become disabling or terminate fatally. Also, an unnecessary laparotomy is not without danger in patients with concomitant cerebral, thoracic, or extremity trauma.

A medical history is useful, especially in elderly patients who have other disabilities, such as cardiac, renal, hepatic, or cerebral disorders; diabetes; allergies to drugs; or who are habitual users of insulin, ACTH, cortisone, or alcohol; or who tend to bleed.

DIAGNOSIS AND TREATMENT

Diagnosis and treatment are carried out simultaneously, with attention directed to immediate lifesaving measures, which are indicated by inspection of the patient.

A clear airway must be present or established so that the patient can breathe, and a sucking wound of the chest must be closed. Obvious external bleeding must be controlled, and when concealed hemorrhage is suspected, an effort must be made to combat the effects of a reduced blood volume by the administration of whole blood, plasma, or plasma substitutes.

In many instances, the patient does not appear ill after sustaining a mild or moderate injury. The entire abdominal wall must be ex-

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aminated (figure 1). When the examination discloses no immediate evidence of internal injuries, the patient may desire to go home or continue on to his intended destination. No extensive therapy is indicated, but he should be told of the possible consequences of the accident, and a period of observation while resting in bed should be advised. It is a mistake to lose sight of a patient with potentially serious but slowly developing complications. In those with immediate symptoms of abdominal distress or pain and with the likelihood of injuries disclosed by the physical examination, a more elaborate plan of management is followed.

Pain is not a constant symptom in visceral damage. When pain is persistent, an estimate of the probable extent of internal injury should be made (figure 2). For example, an injury to the lower left chest or the left upper quadrant should focus attention on the spleen. Injury to this organ is frequently the cause of death from hemorrhage, and a strong suspicion that the spleen has been injured warrants abdominal exploration. Injuries to the pelvis often involve the bladder, rectum, or urethra. On the right side of the abdomen, injuries to the liver, right kidney, and

duodenum must be suspected, while periumbilical injuries may involve the small and large bowels, pancreas, and diaphragm (figure 3). The rectal examination may disclose blood in the bowel.

The decision to operate depends on what evidence of internal injury is found immediately or what evidence develops in the course of a reasonable period of observation. This is the time that must be well spent, and the following plan has been of help to determine the need for exploration:

1. A catheter is inserted into the bladder, and all urine is collected; its volume is measured; and its content of blood, albumin, casts, or cells is noted.

2. A Levin tube is passed into the stomach, and suction is applied. This prevents distention and facilitates surgery when the latter becomes necessary. Accurate data are kept on the volume and the character of the fluid aspirated from the stomach.

3. The patient is given nothing by mouth except a mouthwash. One liter of a 5 per cent solution of dextrose in water is given intravenously at the rate of 1 drop per second.

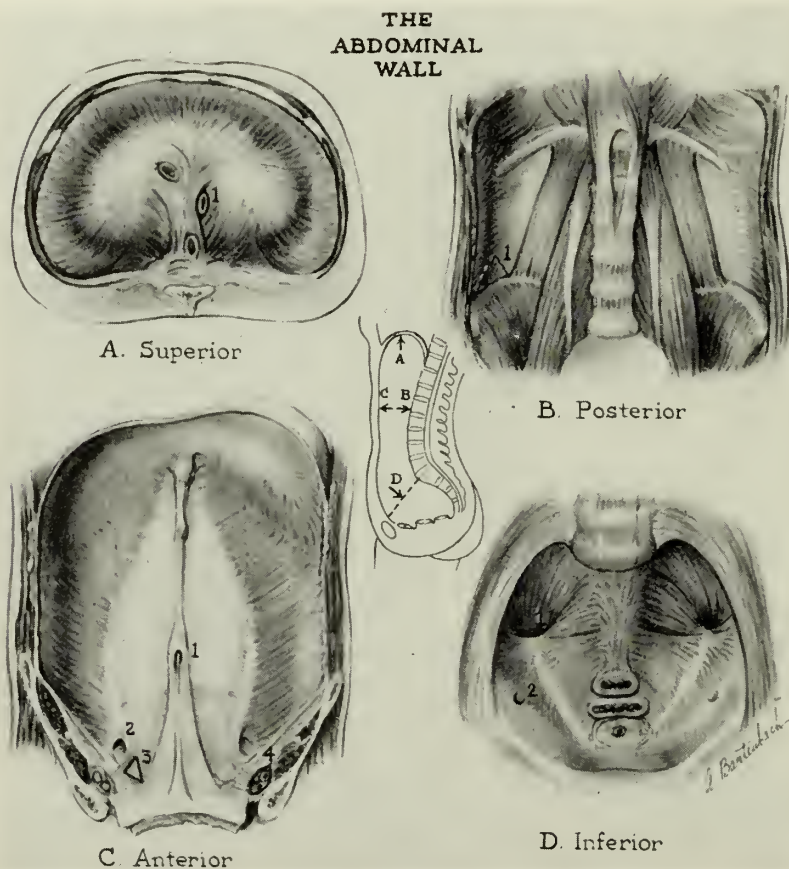


Fig. 1. The abdominal wall surrounds the abdominal cavity with its contents. Blunt trauma may involve the wall or any of the viscera. The "roof" and "floor" are frequently neglected.

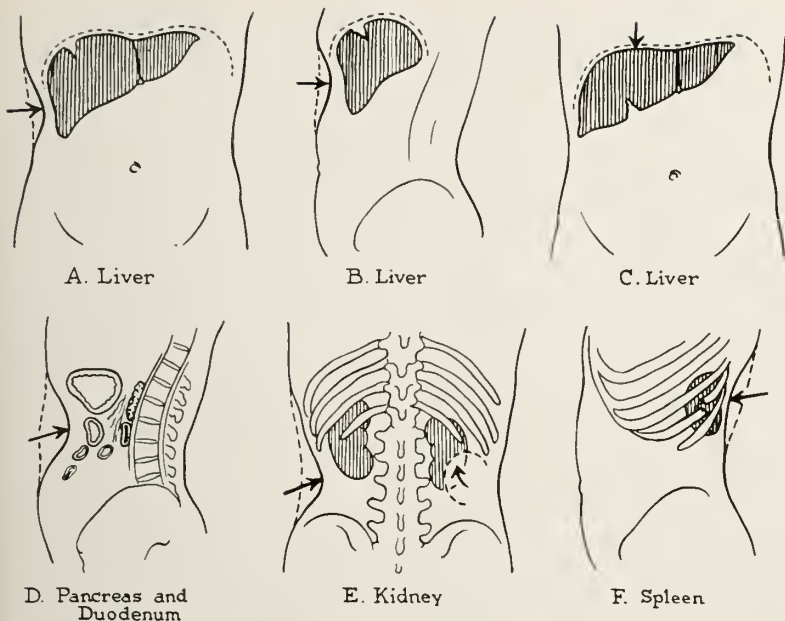


Fig. 2. Correct diagnosis frequently is made promptly by a suspicion of what has happened on the basis of the history and the physical findings. Illustrated are mechanisms of injury to fixed viscera from nonpenetrating wounds (indicated by arrows).



Fig. 3. A small perforation in the diaphragm followed blunt trauma to the anterior abdominal wall. Symptoms were not characteristic for a period of six months after injury. Incarceration of the stomach in the pleural cavity with obstruction at the cardia and pylorus resulted in a distended stomach. Note fluid level in stomach and a clear costophrenic angle.

4. Blood typing is done, and blood is cross-matched for transfusion when this becomes necessary. It is better to have blood made available without haste in every instance of suspected hemorrhage than to await an urgent demand for blood and risk an error in typing or crossmatching.

5. Roentgenograms are made with the patient in the horizontal and in the vertical or left lateral position. They are useful in detecting pneumoperitoneum or soft tissue shadows, viscera displaced by hematoma formation, elevation of the diaphragm, free fluid in the peritoneal cavity, and fractures of ribs, spine, or pelvis.

6. A chart is used to record: (a) blood pressure; (b) pulse and respiration rates; (c) hemoglobin estimation, red blood cell count, and hematocrit reading; (d) the presence or absence of bowel sounds; and (e) urine and gastric contents. Re-examination is made often to note significant changes that indicate either hemorrhage, peritonitis, urinary extravasation, or bleeding into the urinary or gastrointestinal tracts.

Patients with abdominal trauma are frequently brought to the hospital so promptly that diffuse peritonitis has not yet been established, and evidence of hemorrhage is not yet obvious. In some instances, peritonitis due to necrosis of the bowel from an injured mesentery may not take place until several days after the injury. This emphasizes the need for repeated examinations. Special tests are of value, such as amylase determinations in suspected pancreatic injuries.

Injuries to the abdominal wall and the lower thoracic walls are usually painful. Examination for internal injuries is difficult and requires the evaluation of all clinical and laboratory data to establish a diagnosis and to arrive at the decision to resort to surgery. Hemorrhage alone is rarely painful, and close observation with repeated clinical and laboratory studies helps to establish a diagnosis. Peritonitis is always painful, but the degree of pain is influenced by the duration of time since the injury, the amount of chemical contamination, and the rapidity of bacterial growth. Age, a strong physique, and the presence of shock alter the reaction to pain, and these factors must also be considered.

A rapid pulse with falling blood pressure, hemoglobin, red cell count, and hematocrit indicate hemorrhage. A rapid recovery from shock with a small amount of blood indicates that little hemorrhage has occurred, but failure of shock to respond to continuous blood transfusions does not necessarily mean continued or extensive hemorrhage, for peritonitis, too, may be responsible for shock. In such cases, there is a great danger of giving too much blood, with resulting pulmonary edema. Repair of leaking perforations in the gastrointestinal tract is necessary as a resuscitative measure in peritonitis. Resuscitation should continue during and after operation until shock is overcome.

Muscular rigidity, absence of intestinal sounds, and signs of shock are evidence of leakage from an injured hollow viscus into the peritoneal cavity. Surgery should not be delayed. Most unfortunate is the retroperitoneal rupture of the duodenum. This may be neglected because of the absence of an early peritoneal reaction. A roentgenogram showing free air about the right kidney is an aid to diagnosis. Injuries to the jejunum and ileum may be unaccompanied by pneumoperitoneum, and many hours may elapse before signs of spreading peritonitis are manifest. Thus, it may be necessary to repeat x-ray studies if convincing evidence of leakage is demanded.

It is difficult at times to distinguish between muscle rigidity in response to peritoneal irritation and muscle spasm due to direct or indirect trauma. The presence of normal bowel sounds speaks against perforative peritonitis. An injury to the deep epigastric vessels with hemorrhage into the abdominal wall may be confusing. Here, too, normal bowel sounds suggest an abdominal wall injury.

Retroperitoneal hemorrhage, kidney injuries, and fractures of the spine are frequently fol-

lowed by adynamic ileus. In all of these, bowel sounds may be absent or diminished. However, hemorrhage may be detected by a fall in hemoglobin, red cell count, and hematocrit; renal injury, by the urine examination and pyelogram; and a spinal injury, by x-ray studies. However, spinal shock without vertebral fractures may result in ileus and an inability to urinate. This must be evaluated in the case study.

The rectus sheath syndrome is an entity characterized by the sudden or gradual development of a hematoma within the rectus sheath due to rupture of the rectus muscle, with hemorrhage or rupture of the deep epigastric vessels (figure 4). General appearance of the patient frequently resembles that of one with a serious intra-abdominal pathologic condition. The tenseness of the hematoma is frequently mistaken for muscle rigidity. The important factors in distinguishing this syndrome from other abdominal conditions are a careful history concerning the onset and the course; the physical examination, noting in detail the local condition; the distinction between muscle rigidity and a tumefaction in the muscle; and a recognition of the peculiar limitation to the rectus sheath. When, because of a mistaken diagnosis, an intra-abdominal condition is suspected and surgery is undertaken, the operation will disclose the hematoma, the status of the rectus muscle, and the site of active bleeding. Bleeding may now be controlled, the hematoma evacuated, and the damaged muscle removed or repaired. Healing usually follows without complication.

Spasm of the rectus muscle often follows injury to the chest and is limited to the side that is traumatized. Similarly, injuries to the abdominal wall on the right side are frequently associated with fixation of the right side of the chest because of spasm of the musculature. A right rectus injury is associated with a restriction of respiration and diminished breath sounds on the side of the wound, with no evidence of bronchial obstruction or atelectasis. The relationship between the chest and abdomen when there is no pathologic change involving both is shown in figure 4. The intercostal nerves play a role in this phenomenon. Blood in the pleural cavity also may be responsible for rectus muscle spasm, which frequently occurs in association with pleurisy, pneumonia, and epidemic pleurodynia. Abdominal exploration should be avoided when the clinical and x-ray studies indicate the absence of an intra-abdominal injury and sufficient thoracic injury or disease to account for the abdominal pain.

Disruptions of fascia result in herniations,

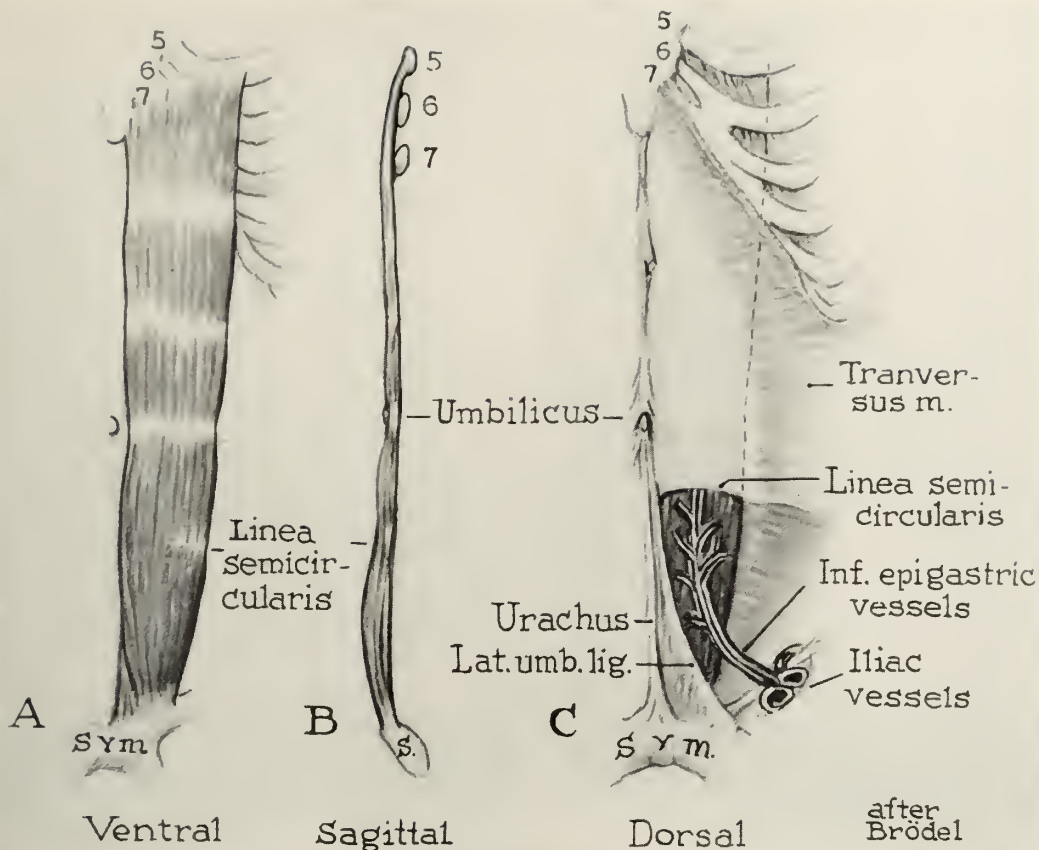


Fig. 4. The rectus muscle, its sheath, vessels, and attachments. Note relation to lower chest. Chest injuries result in spasm which may be mistaken for the presence of an abdominal injury.

especially in those parts of the body which have notable fascial weaknesses. In some instances of blunt trauma with rupture of the thoracic diaphragm, herniation of the abdominal viscera into the thoracic cavity occurs and may not be detected for many months (figure 3), while, in other instances, immediate symptoms appear and the condition is promptly recognized (figure 5a and b).

When blood appears in the urine, the latter is collected in separate containers at intervals, and re-examination is made to determine the amount and the persistence of renal bleeding. Bladder injuries may be suspected from the presence of blood in the urine when the kidneys are not involved in trauma. When renal injury is suspected, an intravenous pyelogram to demonstrate an efficient kidney on the opposite side is important. The inadvertent removal of a solitary damaged kidney is, of course, fatal. In injuries to the bladder, the repeated desire to void is more characteristic than any other symptom. A cystogram may be necessary to demonstrate the defect, but rupture or leakage also may be demon-

strated when the opaque medium used for the intravenous pyelogram clears through the kidneys and enters the bladder.

An injured kidney is rarely so severely damaged that immediate removal is necessary. Conservation of the kidney should be the practice, and surgery should be done only when it is obvious that further delay is not conducive to the patient's recovery.

SUMMARY

A strong suspicion that the patient is bleeding internally or that a hollow viscus is leaking warrants abdominal exploration. When the physical examination, x-ray study, and laboratory or clinical data indicate that an intra-abdominal or serious abdominal wall injury is present, surgery should be performed without delay, for delay favors deterioration and, often, death.

Whole blood transfusions to maintain blood volume; antibiotics to prevent, inhibit, or destroy infection; tetanus antitoxin or toxoid as indicated; and intravenous dextrose solutions to maintain hydration and kidney function should

be provided. Sedation is necessary, and the use of narcotics and sedatives should be guided by the severity of the pain and the physical status of the patient.

The general principles of surgical management are as follows:

PRINCIPLES OF SURGICAL MANAGEMENT

1. Relaxation of the abdominal musculature is necessary for a thorough examination of the abdominal viscera. Ether administered through an endotracheal tube is most satisfactory.

2. The primary incision should be long enough to permit full exposure of the site of injury and give access to all of the viscera. A thoracic injury coexisting with an abdominal injury may require either a transthoracic or a thoracoabdominal incision so that the associated chest injury may be repaired. Diaphragmatic defects must be repaired.

3. Control of hemorrhage is the best safeguard against shock and deterioration of the patient during or after surgical intervention.

Torn mesenteric vessels must be ligated to prevent an enlarging hematoma in the space between the leaves of the mesentery.

4. A systematic examination of the viscera must be made, keeping in mind that the small bowel, transverse colon, and sigmoid colon may move away from the site of abdominal trauma because of a mobile mesentery.

5. All gastrointestinal wounds must be closed. A single unsutured perforation may make the most extensive operation useless. Special note should be made of the following: (a) *duodenum*. Injury to this organ is frequently fatal either because of delayed care or neglect of proper care. Extensive mobilization is necessary for adequate visualization and the repair of wounds without tension. The hepatic flexure of the colon is displaced inferiorly by severance of the hepatorenal ligament, and the peritoneum on the lateral side of the duodenum is incised to turn the organ medially. Fistula formation is a formidable sequel to inadequate closure of a rent in the duodenum. Use of a Chaffin tube and sue-



Fig. 5 *a* (left) and *b* (right). Patient with rupture of the diaphragm and fractures of the pubic bones after blunt trauma when struck by an automobile. Almost all of the gastrointestinal canal has "moved up."

tion to maintain a dry field aids in healing this complication. (b) *colon*. Fixed portions of the colon require mobilization for complete examination. Injuries to the colon, sigmoid, and intraperitoneal rectum are sutured. A cecostomy is made for decompression when necessary. A bowel or its mesentery with extensive injuries is exteriorized when a resection cannot be performed safely or when the condition of the patient warrants this limited procedure. (c) *rectum*. Wounds of the extraperitoneal rectum are managed by sigmoid colostomy in discontinuity. The perirectal space is drained through a postanal incision, and a large de Pezzer catheter is inserted within the anal sphincter to permit exit of any discharges.

6. Devitalized or severely damaged bowel should be excised and foreign material removed with restoration of continuity by the type of anastomosis that can be done readily. Ileostomy must be avoided.

7. If the liver is damaged, the contaminated retroperitoneal space and the subphrenic space must be drained.

8. Repair of a torn or perforated wall of the bladder is accompanied by drainage of the perivesical space. An indwelling catheter is necessary to maintain an empty bladder.

9. The 5 solid viscera in the abdomen are noted: (a) *kidneys*. It is rarely necessary to remove a kidney immediately after injury is sustained. However, continuous bleeding into the bladder or the development of a progressively

enlarging hematoma may make surgery necessary. (b) *liver*. Active hemorrhage from injuries to the liver may be controlled at times by packing with Gelfoam. Loose fragments of liver and other easily accessible foreign bodies are removed. Liver suture should be done when possible. Drainage through a subcostal incision is essential, and these drains must be left in place for at least one week to ten days. In extensive pulping or fracturing of the liver, hemorrhage continues, and control of bleeding is at times difficult. (c) *spleen*. Injury to the spleen results in massive hemorrhage either immediately or after some delay. Splenectomy is the procedure of choice. The danger of late hemorrhage warrants laparotomy on suspicion if clinical evidence and x-ray studies indicate that a hematoma is present about the spleen. (d) *pancreas*. Injuries to this organ are repaired, and drainage of the retroperitoneal space and lesser peritoneal cavity is provided. (e) *adrenal gland*. Rarely is this organ involved. Repair and control of bleeding are attempted, and devitalized portions are removed or transplanted.

10. Closure of the abdominal wound is made with precautions taken to avoid evisceration. Drains leave through stab wounds, and exteriorized loops of the large bowel pass through openings separate from the primary incision.

Figures 1, 2, and 4 are from *Christopher's Textbook of Surgery*, edited by Loyal Davis, sixth edition. Philadelphia: W. B. Saunders Co.

WHEN THE CAUSE OF unilateral axillary lymphadenopathy cannot be explained by usual examination, surgical biopsy of an involved node is frequently of diagnostic value. Biopsy specimens prepared by the frozen-section technic are examined microscopically; if the lesion appears to be inflammatory, bacteriologic studies are done.

Biopsy specimens revealed nonspecific changes, such as inflammation or fat replacement in 50, or 69.5 per cent, of 72 instances of unilateral axillary lymphadenopathy. Malignant disease was diagnosed in 23.6 per cent; 10 patients had malignant lymphoma; 3, adenocarcinoma originating in the homolateral breast; 2, adenocarcinoma of unknown primary site; 1, malignant melanoma; and 1, squamous-cell carcinoma originating in the lung.

E. HARRIS PIERCE, M.D., HOWARD K. GRAY, M.D. (deceased), and MALCOLM B. DOCKERTY, M.D., Mayo Clinic and Foundation, Rochester, Minnesota. *Ann. Surg.* 145:104-107, 1957.

Tuberculin Testing in Iowa Schools

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IN 1944, the Committee on Tuberculosis of the American School Health Association appointed a subcommittee for Minnesota, which, in turn, established standards by which schools could receive certification awards after successful participation in tuberculin testing programs.¹ The first school was certified on October 15, 1945. During the intervening years to the present, subcommittees have been formed in other states for the same purpose and function. The Iowa subcommittee came into existence late in 1954, and the standards it established follow closely those which have been used in other states.¹⁻³ For a Class A certificate, at least 95 per cent of all students in a school and 100 per cent of all adult personnel in the school system must be tested with tuberculin, either the Vollmer patch test or Mantoux test using purified protein derivature or old tuberculin. All reactors to the tuberculin test have a chest roentgenogram made. Those who are known reactors need not be skin tested but do have chest films taken. Family members and other close contacts are studied either by chest x-ray films or by a program of tuberculin testing and x-raying of the reactors. Those with positive x-ray findings are referred to their personal physicians, and those found to have active tuberculosis are placed under treatment, which, almost without exception, is carried out in a tuberculosis hospital. The standards for a Class B award are identical in all respects to those for an A award, except that the percentage of student participation may be as low as 80 per cent. These standards apply to all school programs, but the details of the study of family and other contacts vary somewhat, depending on the type of community and the facilities available. The local tuberculosis and health associations, with help, in some instances, from the parent state organization, usually carry out the programs with many community organizations taking part.

Tuberculin testing programs in Iowa schools had been in use prior to school certification, but this report deals primarily with those completed during the first year of formal certification. In

11 counties, 451 schools, comprising about 8 per cent of the total enrollment in Iowa, have had the results of their programs reported. Among 45,337 students tested, 1,377, or 3.04 per cent, were reactors. In those same schools, 541 of the 2,789 adult personnel tested were reactors, an incidence of 19.4 per cent. These figures compare fairly closely with those which Owens³ has reported in North Dakota, where the student reactor rate was 2.41 per cent and the adult personnel reactor rate was 19.9 per cent. Variations in reactor rates are found in different types of populations. In Wapello County, where 99.1 per cent of the students and adult personnel were tested and 63 of 65 schools were certified, it was found that adult personnel in Ottumwa, a city of 35,000 population, had a reactor rate of 34 per cent in contrast to a rate of 12 per cent among rural and small town school adult personnel. The program of school tuberculin testing and awarding certificates is proceeding at a rapid rate and promises to become a large part of our tuberculosis and health association activities.

Thus far, 8 cases of active tuberculosis and 3 cases of tuberculosis of undetermined activity have been reported, emanating from school accreditation programs in Iowa. One situation of special interest occurred in which a 6-year-old girl and her 9-year-old brother were found to be reactors. Their 12-year-old asymptomatic sister, B.G., was then found to have a tuberculin reaction and a cavitory lesion in her left upper lobe, with gastric cultures positive for tubercle bacilli (figure 1). Investigation through the family revealed that a 37-year-old cousin, G.H., had far-advanced pulmonary tuberculosis with bilateral cavitory disease, which was previously unsuspected, (figure 2). He had lived part of the time in the home of the 3 children. He had also lived in the homes of 2 other cousins, one of whom, E.W., age 26, was found to have a right lower lobe tuberculous lesion for which lobectomy has been performed (figure 3). The other cousin, a sister of E.W., has a pulmonary lesion not yet fully evaluated. A windfall of active cases of tuberculosis such as these, uncovered through student tuberculin testing, illustrates how extremely valuable such programs can be. A contrasting experience occurred in that

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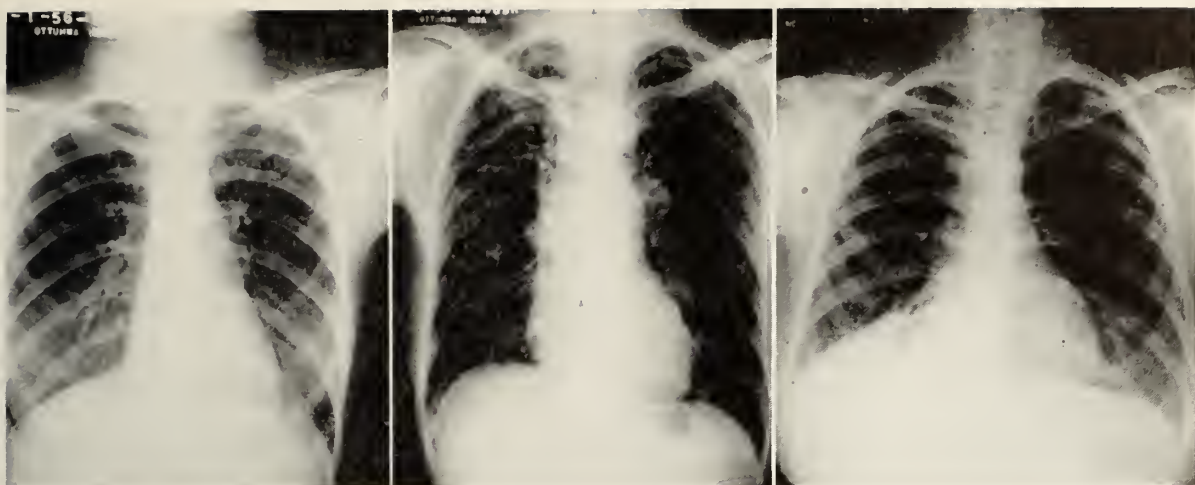


Fig. 1. (left) B.G., age 12, whose disease was revealed after discovery of positive tuberculin reactions in her younger brother and sister when they were tested in a school accreditation program. Chest x-ray shows a cavitary lesion in left upper lobe. Gastric contents yielded bacilli by culture. Fig. 2. (center). G. H., age 37 and cousin of B. G., in whom tuberculosis was discovered in a family contact program after learning that B. G. had active tuberculosis. Disease is cavitary and bilateral. Sputum highly positive on direct smear. Fig. 3. (right). E. W., age 26 and cousin of B. G. and G. H., in whom tuberculosis was also discovered in a family contact program after it was learned that B. G. had active tuberculosis. Right lower lobe was collapsed and contained a cavity. Sputum positive on direct smear. Patient has subsequently undergone a successful lobectomy operation.

same city when a county-wide mass x-ray program for adults was carried out 3 years earlier. Three persons, all of whom failed to visit the mobile x-ray units, were discovered within the next few months to have active pulmonary tuberculosis. One, M.S., a school janitor, had extensive cavitary disease throughout both lungs (figure 4). N.D.Y., the mother of 2 school children, had far-advanced cavitary disease with hemorrhaging (figure 5). The third, a mother of 2 school children, had a "destroyed" left lung and extensive infiltration in her right lung.

In the North Dakota school programs, it was reported that 11 cases of active tuberculosis were uncovered through testing about 23,000 pupils.³ Over a ten-year period of routine tuberculin test-

ing in New Jersey high schools, Bosshart⁴ reported 1 case of reinfection tuberculosis among each 1,600 persons tested. Gray⁵ reported active tuberculosis in 5 parents when 3,900 school children were tuberculin tested and 1 child 6 years old with active disease in a school of 600 pupils. Anderson and Norton⁶ reported finding active tuberculosis in 3 members of 1 family during investigation after the demonstration of positive tuberculin reactions in 2 other student members of that family in a school testing program. It was shown as early as 1924 that in schools in which 10 per cent of students were reactors, the reactor rate among children who came from homes containing active cases of tuberculosis was 80 per cent.

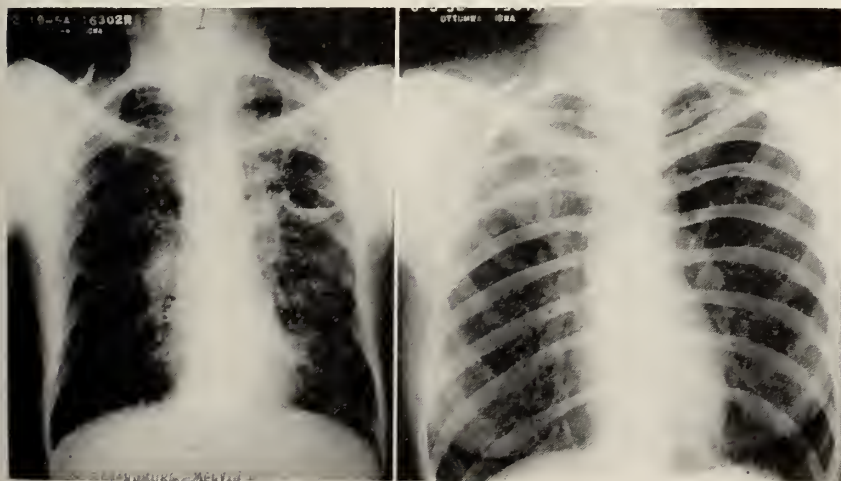


Fig. 4. (left). M.S., a school janitor, in whom tuberculosis was discovered when weakness, lassitude, cough, and dyspnea forced him to seek medical attention. Extensive fibrotic and nodular disease throughout both lungs with multiple cavitation and one giant cavity. Sputum highly positive.

Fig. 5. (right). N.D.Y., mother of 2 children in whom disease was found after severe pulmonary hemorrhage. Extensive disease in right upper lobe with large cavity and small spreads into right lower and left upper lobes. Sputum positive. Her children subsequently reacted.

A number of excellent articles have appeared in recent years regarding the rationale and values of tuberculin testing, especially of school populations.^{1,2,7-11} In these times of gradually decreasing new case report rates for tuberculosis and with the incidence of positive tuberculin reactions becoming lower throughout our population, the skin test becomes more and more valuable as an effective, economical device by which active disease can be sought out. There can be no question regarding the tremendously important need for discovering those with open communicable tuberculosis in the light of current effective treatment now available and considering the fact that our only known effective method for eradicating tuberculosis from human beings lies in preventing the transmission of tubercle bacilli from those with communicable disease to those whose bodies have never been invaded by bacilli. Finding the positive reactor and placing him under constant radiographic observation so that his "reinfection" disease will be discovered promptly, should it develop, and searching among his close contacts for the source of open disease so that that person will cease to sow tubercle bacilli in others as yet uninfected make up a program which should lead us closer to the goal of tuberculosis eradication.

Myers¹² states that 10 to 13 times more clinical and contagious cases of tuberculosis have been found by school testing programs than by mass chest x-ray film surveys. It should not be forgotten that the tuberculin test is our best device for discovering those 10 to 15 per cent of persons with active tuberculosis in whom disease develops extrathoracically or in pulmonary form without casting detectable x-ray shadows.

Suggestive evidence for the effectiveness of school programs as a control measure may be seen in the steady lowering of student reactor rates from 47.3 per cent in 1926 to 3.9 per cent in 1954 in a group of Minneapolis grade schools² and in the recent finding of not a single reactor

in 79 per cent of the schools in a predominately rural Minnesota area where, incidentally, participation by students and adult personnel was 100 per cent in 108 of 175 schools tested.¹³

Other values, less readily estimated, spring from the actual active participation in the school testing programs by students, teachers, parents, civic organizations, and medical and allied professional people in the community. Related and, perhaps, more valuable is the fact that school programs can supply the springboard for similar programs for selected groups, such as food handlers, hospital admissions, and nursing homes. Indeed, they can, and are, leading to programs of surveying the public-at-large by means of tuberculin, which is felt by many to be the tuberculosis case-finding program of the future.

The main key to conducting a successful school tuberculin testing program is careful and detailed planning. Plans are best worked out individually in each community and should be supervised by the medical profession. Gray,⁵ in his St. Louis experiences, attested to the fact that participation by physicians in the community is worthwhile. He has also described details for planning and carrying out school programs.

SUMMARY

1. The school tuberculin accreditation program has been described.
2. A description of the Iowa program has been given, together with reactor rates and results in terms of discovery of cases of active tuberculosis. Illustrations of active disease discoveries from Iowa and other states have been related.
3. The rationale and values of such programs have been discussed.
4. It seems apparent that in our present state of effective treatment for tuberculosis and lowering incidence of the disease, use of the tuberculin test in school certification programs provides a reliable, economical, practical, and very valuable method of progressing toward tuberculosis eradication. Its widespread use is recommended.

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The Problem of Subacute Bacterial Endocarditis with Negative Cultures

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THERE ARE NUMEROUS REPORTS in the literature of cases of subacute bacterial endocarditis in which the offending organisms had been impossible to recover from the blood stream during life despite the fact that repeated blood cultures were taken and that, at autopsy, the organism could be demonstrated in the vegetations on the heart valves. Several examples of such reports follow.

In 1937, Keefer¹ reported on 54 cases that had been autopsied at the Boston City Hospital. Blood cultures and the heart's blood culture at autopsy were negative in 11, or 24 per cent, of cases. He stated that numerous blood cultures were taken during life in each case. In all of the 11 cases, the organisms were demonstrated by microscopic examination of the heart valves.

In 1951, Cates and Christie² reported on 442 cases of SBE. All patients they saw with negative cultures were not included in the report, but, of the cases reported, 34, or 8 per cent, had persistently negative blood cultures. In 23 of these 34 patients, 3 to 10 blood cultures had been obtained, and, in the remaining 11, fewer than 3 cultures had been obtained. Fifteen of these 34 patients came to autopsy. In 13 of these 15 patients, vegetations were similar to those seen in patients with positive blood cultures; the other 2 had vegetations which were described as "fibrinoid" or as "brownish granular deposits." Sections of the vegetations were stained for organisms in 11 of these 13 cases, and colonies were seen in 6.

Loewe and Eiber,³ in 1947, reported on a series of 166 patients. Of these patients, 11, or 7 per cent, had persistently negative blood cultures despite recourse to anaerobic methods, enriched mediums, arterial punctures, and cultures taken after the administration of epinephrine. The diagnosis in 2 of the cases was confirmed by autopsy findings. Since 8 of these 11 patients re-

covered after moderately large doses of penicillin and streptomycin, they suggested that perhaps response to antibiotics could be used as a diagnostic test in these cases.

In addition to these, there are other similar reports in the literature. Kerr,⁴ in his extensive review of the subject, states that, on the average in most reported series, the offending organism was not recovered on blood culture in about 20 per cent of cases.

There has been a good deal of speculation concerning the nature of the bacteremia in SBE and the reason for the failure to recover the organism in these 20 per cent or so of cases. Bennett and Beeson⁵ remark that, in this disease, it is striking to note that blood cultures are usually either all negative or all positive and that an isolated positive culture is rarely seen. Kerr,⁴ however, feels that the ease and abundance of culture varies widely from case to case. Belli and Wäisbren⁶ report that, in the various series reported in the literature, the percentage of positive cultures of all cultures taken on cases in which the organism was subsequently isolated has varied from 40 to 90 per cent.

There is some indication, over short periods of time at least, that the discharge of organisms from the heart valve takes place at a relatively constant rate rather than intermittently. Beeson and associates⁷ took samples of blood at five-minute intervals over a two-hour period from the brachial artery of 6 patients with SBE. They found that the colony counts on these samples remained relatively constant. Weiss and Ottenberg⁸ reported similar findings on counts taken at four-hour intervals over a period of two days. It is interesting to note that they found the relation of bacterial count to body temperature relatively inconstant.

Bloomfield and Halpern list 6 reasons why the blood cultures may be negative and state that failure to recover the bacteria on blood culture does not exclude the presence of living organisms on the vegetations or in the blood stream. Their 6 reasons are as follows:

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- "1. The bacteria may be so few in numbers that they are actually absent from small samples of blood.
- "2. The bacteria may fail to grow in culture if their numbers are few or their nutritional requirements fastidious.
- "3. Bacteria may be filtered out in the capillaries if venous blood is used for culture, although blood from antecubital veins gives colony counts only slightly lower than arterial blood.
- "4. If the immunity of the body is high, organisms swept into the blood stream may be promptly killed or inhibited so that growth fails.
- "5. The bacteria may be growing chiefly in masses of vegetation, where they are sealed off by fibrin so that bacteremia is rare.
- "6. With right-sided lesions, it may be hard to isolate organisms from peripheral venous blood because of filtration in the lungs."

To these may be added a seventh reason, which is previous antibiotic therapy. Finland⁹ postulated that inadequate antibiotic therapy promotes healing with a resultant "greater sequestration of organisms within fibrin and within scar tissue so that they are less likely to reach circulating blood." Belli and Waisbren,⁶ in 82 cases of bacteriologically proved SBE, found positive cultures in 53 per cent of patients who had not received previous antibiotic therapy, whereas in those who had received previous therapy, 31 per cent were positive.

Cases of SBE in which the blood culture is persistently negative are generally referred to as "abacteremic." This term has been somewhat confused with the term "bacteria free," which was first used by Libman.¹⁰ By the term "bacteria free," Libman meant to designate those cases not only in which bacteremia could not be demonstrated but also in which no bacteria could be demonstrated in the vegetations on the heart valves. He felt that such cases represented instances in which the infection had been overcome by the natural defenses of the body but only at a time when the sequelae had become sufficiently severe to lead to the death of the patient. These sequelae, according to Libman, are characteristically renal insufficiency caused by subacute or chronic glomerulonephritis, a progressive anemia, striking splenomegaly, and embolic accidents including, although rarely, embolic aneurysms. Fever is usually absent, and skin pigmentation and heart failure are prominent features. These cases represent about 20 per cent of cases seen by Libman.

Some have objected to Libman's use of the term "bacteria free." Kerr,⁴ for example, feels that many of the cases so designated actually represent cases of disseminated lupus erythematosus. Loewe and Eiber³ state that some of Libman's cases may actually be "abacteremic" rather than "bacteria free."

Regardless, however, of what may be the correct incidence of "abacteremic" and "bacteria free" cases, it seems unquestionable that cases of SBE do occur with active infection on the heart valves but in which bacteremia cannot be demonstrated. Now that effective therapy for SBE is available, these cases present a considerable therapeutic problem. It centers about questions of when to start therapy, how many cultures to obtain, and what type of therapy to give.

There are a number of articles in the recent literature^{6,9,11} in which the authors no longer advocate waiting until the results of blood cultures are reported before beginning therapy. Among the reasons given are the following:

1. It is thought that if positive cultures are not obtained after the first few cultures, the chances of recovering the organisms on subsequent cultures is so slight that awaiting the results of cultures to determine if more should be drawn to establish the diagnosis is not justified. There are a number of reports in the literature which attempt to substantiate this. Griffith and Levinson,¹² reporting on 140 positive blood cultures drawn on 57 patients, found that 97.8 per cent were obtained within two days and that only 1 was positive for the first time after five days and this not until the fifty-sixth day after 76 negative cultures had been drawn. Belli and Waisbren,⁶ reporting on 82 patients, obtained positive results in 92 per cent with the first 5 cultures that were drawn; however, 8 per cent of the patients required up to 10 cultures before a positive result was obtained. Cates and Christie² reported positive results in 90 per cent of 83 patients after only 3 cultures.

Reviewing these data, Finland⁹ concluded that "from a bacteriologic point of view, a delay of more than forty-eight hours or, at most, five days (before beginning therapy) is logistically unsound and does not seem justified provided that treatment is begun only after adequate samples of blood for culture have been obtained during this waiting period for further examination; only rarely would one expect to obtain positive results after two to five days of intensive efforts."

2. As has been pointed out earlier, in some patients, positive cultures may never be obtained even though active infection is present and diligent search is made.
3. The period of waiting for the culture to grow out may actually be deleterious to the patient. It is well known that some organisms may not show growth in cultures until after three weeks' incubation. Friedberg¹¹ attempted to show that there was a direct relation between duration of illness before therapy and success of therapy. In his series of 140 patients, 89 per cent recovered who were treated less than two months after the onset of their illness, as compared with 55 per cent who had been ill more than two months before therapy was started. However, Dawson and Hunter,¹³ in 1946, reported that no direct relation appeared to exist between outcome of therapy and duration of illness. Priest and Smith,¹⁴ in 1955, reviewed 16 cases of patients who had survived ten years after recovery and could not correlate duration of illness prior to therapy with the outcome of therapy.

Jawetz, in his discussion of Friedberg's article, states that treatment of SBE does not usually require emergency measures and that, ordinarily, a delay of a week or two, until blood cultures and sensitivity tests are available, is justified before beginning therapy. Apparently, others share this opinion, but I could not find any recent articles that opposed beginning therapy before blood culture reports were available. Finland,⁹ in reviewing this aspect of the problem, concluded that "only further experience will demonstrate whether the mortality in patients who are treated promptly, that is, as soon as the clinical diagnosis is established, is really lower than that in which treatment is delayed until after results of blood cultures are obtained."

Several reasons have been given by several authors for not starting treatment until the results of blood cultures are available.^{9,11} Among them are the following:

1. Without the confirmatory evidence of positive blood cultures, the diagnosis is always more doubtful. It is unfortunate to subject a patient to the expense and hardship of treatment for SBE when some other condition exists.
2. The initiation of treatment for bacterial endocarditis in patients with other diseases may result in halting efforts to establish the proper diagnosis.

3. Perhaps the fact that cases have been reported of patients who were successfully treated with other antibiotics after penicillin and streptomycin failed is another reason for awaiting the results of culture and making a very intensive effort to obtain a positive culture before starting therapy.

Opinion seems to be divided as to whether to start therapy before or after the results of cultures are available. However, it seems that most would now agree with the statements, some of which are quoted directly from Kerr's⁴ book. ". . . Any patient with a heart murmur who demonstrates a fever of a week or more in duration, of uncertain cause, (should) be regarded as having SBE until otherwise proved. Multiple blood cultures, despite careful technic, cannot rule out a diagnosis of SBE." Clinical evidence is ". . . sufficient for a working diagnosis which is mandatory to therapeutic action."

What constitutes sufficient evidence for a clinical diagnosis has still to be determined. Kerr accepts unexplained fever of more than one week's duration and a heart murmur, particularly if there is history of an operative procedure, as sufficient evidence. Finland requires, in addition, other manifestations, such as petechiae, embolic phenomena, splenomegaly, or anemia.

With regard to the number of cultures that should be taken before starting therapy, there seems to be considerable variation in the literature. Friedberg¹¹ takes 2 cultures on two successive days and then begins therapy. Belli and Waisbren⁶ take 5 venous, 1 arterial, and 1 bone marrow culture and then start therapy if the patient meets the criteria for the disease advanced by Friedberg (an unexplained fever of two weeks' duration in a patient with valvular heart disease and a normal sinus rhythm). Feder¹⁴ draws 3 cultures on the first day and then 1 on each of the two succeeding days and begins treatment when cultures are reported.

Finland⁹ describes in detail the procedure which he advocates before beginning treatment, which is as follows: "Multiple blood cultures must be performed during the first two to five days, and opportunities must be taken to obtain such cultures in relation to special episodes, such as chills, rises in temperature, and the occurrence of new embolic phenomena or petechiae, and, perhaps, after mild physical exercise. It is, therefore, best to obtain a culture on more than one occasion up to four or more times each day. Under optimum conditions, cultures should include, in addition to the routine broth mediums, special mediums that permit the growth of fastidious organisms, including anaerobes and fun-

gi, incubation of these cultures for as long as three weeks before they are discarded as negative, and cultures of bone marrow, particularly in patients who are or have been under treatment with antibiotics."

Opinion also varies concerning the manner in which to treat these patients. Finland⁹ begins treatment with the intramuscular injection of 2,000,000 units daily of soluble penicillin G. He increases the dose to 8,000,000 to 12,000,000 units daily and adds 2 to 3 gm. of streptomycin daily if fever and symptoms do not respond well in the first week. He continues treatment for six to eight weeks.

Kerr⁴ begins with 5,000,000 units of penicillin and 2 gm. of streptomycin daily. If the patient fails to respond clinically in forty-eight hours, he doubles the dose of penicillin. If a response is not achieved twenty-four hours later, penicillin is increased to 20,000,000 units and streptomycin to 3 gm. When response is still not obtained, he favors raising the dose of penicillin even up to 120,000,000 units daily rather than add other antibiotics. He feels that in the absence of a good clinical response, it is important to increase the dose rapidly because:

1. The organism may be a staphylococcus and develop resistance to penicillin rapidly.
2. The organism may be an enterococcus, which ordinarily requires large doses of penicillin and streptomycin before infection is controlled.

He suggests that a thorough search for foci of infection be made in the hope of recovering organisms from them. He suggests that if the focus can be deduced with reasonable certainty, antibiotic agents might be used which are known to be effective against organisms usually found there. He states that sometimes interruption of all therapy is followed by a satisfactory response upon resuming it. He attributes this to the bac-

teria emerging from a resting state to a metabolically active state when treatment is stopped. Antibiotics are then more effective against the metabolically active organisms. He continues treatment for six weeks.

Feder¹⁵ begins with 10,000,000 units of penicillin and 2 to 3 gm. of streptomycin. If there is no clinical response in forty-eight hours, he doubles the dose of penicillin. If, after twenty-four more hours, the temperature has not become normal or appreciably lower, he discontinues both drugs and uses one or a combination of other antibiotics. If penicillin and streptomycin are partially effective, he continues them but adds other antibiotics. When an effective combination is found, he continues this for a period of five weeks. There have recently been a number of articles in the literature on short-term therapy (two weeks) of SBE using a combination of penicillin and streptomycin. In only one of these articles could I find where treatment in this manner of "abacteremic cases" was carried out. This was in an article by Geraci.¹⁶ He treated 2 patients, and both of them recovered.

In conclusion, it might be well to note what the outcome of treatment has been of cases with negative cultures. Cates and Christie² reported a recovery rate of 18 per cent in 34 patients. They used a maximum of 2,000,000 units of penicillin daily, and many of their patients, 82 per cent, died in heart failure. Loewe and Eiber³ reported on 11 patients, 8 of whom recovered. They used up to 10,000,000 units of penicillin daily. Friedberg¹¹ reported a 38 per cent recovery rate in 26 patients with negative cultures. However, 8 of these had received no treatment because the diagnosis was not made prior to death. These figures contrast with the 65 to 70 per cent recovery rate reported for cases of SBE in general¹¹ over the corresponding period of time.

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Plan for a Cancer Registry in Small Hospitals

A CANCER REGISTRY can be easily installed in any small hospital, and the advantages it offers are many. Every doctor on the staff should be interested in and exert every effort possible to establish and maintain such a registry. The Cancer Committee of the North Dakota State Medical Association and the North Dakota Division of the American Cancer Society are in the process of introducing a simple, compact, and inexpensive plan for establishing a cancer or tumor registry in every hospital in the state. This system needs but a minimum of trained or untrained clerical help.

The purposes of a registry are fourfold:

1. To record every cancer patient, both private and public, inpatient and outpatient, admitted to the hospital.

2. To have a file of abstracts available with a diagnosis and treatment.

3. To systematically follow-up all cancer patients as long as they live.

4. To report annually to the hospital staff their deaths, cures, and salvage rate.

The Cancer Committee is comprised of 8 doctors from different areas in the state. There are approximately 70 hospitals in North Dakota. These hospitals are divided equally among the committee, so that each doctor will have the responsibility of introducing, supervising, and maintaining the registry in 7 or 8 hospitals. We plan to establish approximately 10 to 15 registries per year, so that by the end of a five-year period, we hope to have well-established registries in every hospital in the state.

The 3 minimal records needed to operate a registry are: (1) a cancer abstract form, (2) space for follow-up recording, and (3) an accession record.

There are several systems for cancer registries which may be used. All of them meet the requirements set down by the American College of Surgeons for maintaining such a registry. The system we use is obtained from the Medical Case History Bureau, New York City. Our abstract form must be filled out with the utmost care and accuracy as it is a valuable future reference. The source of information for preparing this form is the hospital record itself. In the event the record lacks information or other details, the attending physician is consulted, and he usually supplies this information. At the top

of the abstract form, colored metal tabs are used to classify the cancer sites. The "international statistical classification" is used. When arranged properly in the file, all cases occurring in the same system appear in the same column in the files, and it is easy to pull from the file all malignancies occurring in a given organ. Each physician also has a code number. A simple system of follow-up is provided in the 4 last spaces at the top of the abstract card.

The back of the abstract record carries a simple check-off form for follow-up information. Once a month, the secretary of the registry goes through the files and pulls out the cards with follow-up tabs of the current month. She arranges the cards according to the doctor's code number. As she does this, she watches the source of contact column on the follow-up form and removes the source if the last contact was other than the attending physician. She then completes form letters to all doctors on each case and includes the patient's name, address, diagnosis, and date last seen at the hospital. The follow-up tabs are removed from the forms of the deceased patients and are replaced with black tabs to the extreme right of the cards to indicate deaths of the patients.

After the abstract form is completed, the case is entered in the accession book. Accession numbers begin with 1 for each diagnostic category and continue in sequence until the end of the year. The following year, the count again starts with number 1. In order to distinguish cases in different categories, the classification code precedes the accession number. For example, a duct-cell carcinoma of the breast is classified 170. If it were the fifth duct-cell carcinoma for the year 1957, the case number would read 170-5-57.

To maintain the registry, it is necessary to: (1) send out monthly follow-ups, (2) post follow-ups, (3) change follow-up date signals, (4) complete accession records for deaths, (5) refile cards on completed follow-ups in the master file, (6) continue follow-ups of patients whose cards have been returned incomplete, and (7) prepare special reports, especially the annual and five-year survival reports.

It is also advisable to have at least 1, and possibly 2, doctors on the staff who are especially interested in cancer and who can observe closely the

medical librarian who has charge of the registry, helping her to obtain the necessary information she needs from other physicians.

There are many difficulties encountered in obtaining follow-up information, especially in intracoe patients. However, the city directories, social agencies, and the Bureau of Vital Statistics in the state usually have valuable information. Cancer registries should be discussed at each monthly meeting of the hos-

pital staff, and, at the annual meeting, a complete report should be given to the staff by the hospital cancer committee.

At a later date, after we are assured this system is functioning properly, a central cancer registry will be established, probably with the Bureau of Vital Statistics in the State Department of Health.

C. M. LUND, M.D.,
Williston, North Dakota

Textbook of Medical Physiology, by
ARTHUR C. GUYTON, M.D., 1956.
Philadelphia: W. B. Saunders Co.,
1,030 pages. \$13.50.

This textbook was written in its entirety by Dr. Guyton and is intended to be a general review of human physiology for the medical student and the practicing physician. His ambitious task has been executed well. The textbook touches on all subjects of human physiology and the author's discussion is lucid and straightforward.

A work such as this could not possibly be exhaustive in its treatment of each phase of physiology. But the author summarizes the essential features of each subject that is discussed. The reader who is especially interested in certain fields will find this book somewhat oversimplified. However, as a general review of a vast subject, this textbook can be highly recommended to medical students and practicing physicians.

DAVID GOLD, M.D.

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The Philosophy of Medicine, by
WILLIAM R. LAIRD, M.D., 1956.
Charleston, West Virginia: Education Foundation, Inc. \$3.00.

What is a philosophy of medicine? Dr. Laird has given us his answer in this small volume of 64 pages. To those of us who like to reflect on medicine at its best, this publication is most refreshing.

He considers the philosophy of medicine under the following subjects: logic, esthetics, ethics, politics, and metaphysics.

"Logic," as he states it, "is that part of philosophy which deals with the reasoning processes of thought, observation and inference, drawing conclusions from phenomena witnessed. Its purpose is to make future belief and conduct more reasonable and intelligent." He then goes on to cite instances of medical pioneers who through logic brought about important contributions to medicine. He emphasizes the importance of case histories—the proper recording of facts and the need for



their proper evaluation so that nothing is missed in the search for new discoveries. Quote mortality and morbidity facts from your own case histories and through logic make them teach you to be a better physician.

Esthetics is a needed part of the philosophy of medicine because, as Dr. Laird states, "without it medicine may become lifeless and mechanical." Esthetics gives beauty and art to the professional care of patients.

He cites ways by which the stay in the hospital can be to the patient an enlightening experience in the appreciation of literature, art, and music if we wish to treat the whole patient.

Ethics is beauty in conduct as it applies to doctor and doctor as well as to doctor and patient. Dr. Laird delivers some stern punches to those who hold a superficial attitude about ethics such as, "He is unethical because he stole my patient." As the author points out, "We forget that it is impossible for one man to steal from another that which the latter does not possess."

The chapter on politics considers the physician's responsibility to his community in the things needed for the general welfare. He wisely states "Politics is the study of social organization. Its promotion is not the getting of office and emoluments but intelligent and sometimes sacrificial participation in the social order."

The last chapter deals with metaphysics as it applies to the philosophy of medicine. He quotes Dr. Will Durant's definition of meta-

physics. "It is the study of the ultimate reality of all things; of the real and final nature of matter . . . of mind—and of the interrelation of mind and matter."

Dr. Laird states that metaphysics has returned to its rightful dignified place. As doctors, we must not be content to deal only in terms of science; we must also give our attention to the things unknown so that spiritual values, for instance, may have their rightful place in our profession. Only then can we trust the human being as a whole.

In the pleasant pursuit of this volume, I can be critical only of its brevity. It should be read by all medical students and young physicians to give them a firm foundation for the highest ideals in medicine. It should be read by the older physicians for a realization of what so many of us have so sadly neglected.

ARNOLD S. ANDERSON, M.D.

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Paper Electrophoresis (Ciba Foundation Symposium), edited by G. E. W. WOLSTENHOLME and E. C. P. MILLAR, 1956. Boston: Little, Brown & Co., 224 pages. \$6.75.

This monograph contains the formal papers and informal discussion presented at a symposium on paper electrophoresis held in England in July 1955 and attended by investigators from India, South Africa, many European countries, and the United States. Papers on the evaluation of the albumin-globulin ratio of blood plasma, the analysis of human hemoglobins, and the effect of ACTH and cortisone on the protein-bound serum polysaccharides in rheumatoid arthritis and ulcerative colitis were presented. However, the main emphasis of the meeting was on various technical aspects of the method, for which reason this monograph will be of interest principally to those working with paper electrophoresis in one form or another. The future of the method as a tool in clinical investigation and routine analysis was viewed with optimism.

VICTOR LORBER, M.D.



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American College Health Association News . . .

Charles A. Leech, M.D., has been named acting director of the Student Health Service at the University of Missouri in Columbia. Dr. Leech replaces Dr. George X. Trimble who recently left that position.

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John G. Graziani, M.D., has recently been appointed physician for Longwood College in Farmville, Virginia. Longwood College is one of the members approved at the recent meeting in Baltimore.

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Dr. Eva E. Strahan has accepted a position as physician on the staff of the Health Service at Alabama Polytechnic Institute in Auburn under Director Morgan Brown, M.D. Dr. Strahan previously held a position in the Health Service at North Texas State College in Denton, Texas.

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The following officers were elected at the annual meeting of the Ohio Section in Oberlin on April 12 and 13, 1957.

President—Ruth C. Dutton, R.N., Miami University; vice-president—George Prochnow, M.D., Kent State Uni-

versity; and secretary-treasurer—Gwen Lacy, R.N., Ohio Northern University.

Executive Committee: Paul C. Schumacher, M.D., Miami University; William Palchanis, M.D., Ohio State University; Elmer Werner, M.D., University of Cincinnati; Bertine Long, R.N., Ohio University; Viola Startzman, M.D., Wooster College; and Eleanor Schmidt, M.D., Ohio University—ex-officio.

The 1958 meeting of the Ohio Section has been scheduled for Capital University, Columbus, Ohio, on April 18 and 19. The Section is trying to have regional hosts so that more people will participate and the burden will not be as great on one school. Host colleges in 1958 are Ohio State University, Otterbein College, and Capital University.

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The Rocky Mountain Section of the A.C.H.A. met on Saturday, May 18, 1957, at the University Memorial Center of the University of Colorado at Boulder.

John H. Whitmer, M.D., director of the Student Health Service at the University of Wyoming, was named president-elect of this section for the year 1957-1958.

News Briefs . . .

North Dakota

DR. R. W. RODGERS of Dickinson was installed as president of the North Dakota State Medical Association at the recent annual meeting held in Fargo. Other officers include: Drs. O. A. Sedlak, Fargo, president-elect; J. C. Fawcett, Devils Lake, first vice-president; C. M. Lund, Williston, second vice-president; R. H. Waldschmidt, Bismarck, retiring president who becomes councillor-at-large; C. A. Dodds, Fargo, speaker of the house; R. E. Leigh, Grand Forks, vice speaker of the house; E. H. Boerth, Bismarck, secretary; E. J. Larson, Jamestown, treasurer; W. A. Wright, Williston, delegate to the American Medical Association; and T. E. Pederson, Jamestown, alternate delegate. Dr. P. A. Boyum of Harvey, who was not present to accept his certificate and pin, was the only association member to be admitted to the Fifty Year Club. Drs. William H. Witherstine, Grand Forks, and O. T. Benson, Hollywood, California, formerly of Glen Ullin, were presented with honorary memberships in the Fifty Year Club.

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DR. S. W. HILL, of Regent, was honored for his forty-six years of service to the community on June 20, which was designated "Dr. Hill Day."

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DR. FRANK E. WHEELON, of Minot, recently resigned as Ward county coroner. Before his resignation, Dr. Wheelon was serving his sixth consecutive term as coroner.

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DR. G. D. ICENOGLE, Bismarck, has assumed full responsibility as medical director of crippled children's services in the State Department of Public Welfare. He was appointed to the post January 1 of this year but had worked with the acting director, Dr. Paul L. Johnson, until recently.

DR. MARVIN A. K. LOMMEN recently joined the medical staff of the Capital City Clinic in Bismarck. A native of Fordville, Dr. Lommen graduated from the University of Pittsburgh Medical School, interned at St. Luke's hospital in Fargo, and has been practicing in Mandan for the past year.

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DR. RAYMOND L. COULTRIP, of Cooperstown and Sharon, recently joined Dr. J. M. Muus in the McVile Medical Clinic. Following service in the Air Force, Dr. Coultrip was resident in surgery at Reading Hospital, Reading, Pennsylvania, and resident in orthopedic surgery at Duke University Hospital, Durham, North Carolina.

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DR. A. A. CURISKIS recently moved from New England to join Drs. M. S. Jacobson and W. M. Buckingham at the Elgin Clinic.

Minnesota

THE WACONIA LAKEVIEW CLINIC was opened July 1 by Drs. Iwan Sawaryniuk and John W. Clarke. The newly-constructed, fireproof building houses 19 rooms, including a waiting room; reception room; laboratory, x-ray, treatment, surgery, and examination rooms; and a library.

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OPEN HOUSE was held June 1 at the official reopening of the Melver Clinic in Lowry. The recently renovated clinic, which was named in honor of the late Dr. B. A. Melver, pioneer Lowry physician, will be staffed by Drs. G. E. Lee, R. D. Letson, Roy H. Good, and Burton Kolp.

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THE HEKTOEN GOLD MEDAL of the American Medical Association, top scientific honor at the association's annual meeting, was awarded June 5 to a group of University of Minnesota surgeons for their exhibit showing open-heart surgery. The winners of the award include: Drs. C. Walton Lillehei, Herbert E. Warden, Richard A. DeWall, Vincent L. Gott, Robert D. Sellers, Morley Cohen, who was formerly at the University, R. C. Read, Richard L. Varco, and Owen Wangersteen. The Billings

(Continued on page 28A)

The Vaginal Approach for Diagnosis and Treatment of Ectopic Pregnancy

GEORGE R. THOMPSON, M.D., G. WILSON HUNTER, M.D.,
C. B. DARNER, M.D., and JOHN S. GILLAM, M.D.

Fargo, North Dakota

THE ETIOLOGY OF ECTOPIC PREGNANCY is not always apparent but is generally related to some degree of disturbed tubal physiology. Organic changes in the fallopian tube may be attributed to any of several factors, particularly (1) congenital malformation, and (2) secondary to inflammation.

Generally, the pathologic change is primary damage to tubal epithelial cells and cilia, confluence of rugae, and narrowing of the lumen of the tube. Loss of normal muscle function may be due to atrophy and/or scar tissue, which limits peristaltic activity. These changes may arise as a consequence of damaged nerve or blood supply to the tube. The neuroendocrine balance of tubal physiology is not completely understood, but such factors as autonomic dysfunction and emotional aspects may enter the picture in isolated cases. The importance of either tubal spasm or atony must be considered as a possible etiologic factor in tubal pregnancy. The significance of the relationship of the use of antibiotics in the etiology of this disorder has been viewed with opposite opinions by various authors. The incidence does not seem to be materially affected by the use of antibiotics.

GEORGE R. THOMPSON, G. WILSON HUNTER, C. B. DARNER, and JOHN S. GILLAM are affiliated with the Department of Obstetrics and Gynecology at the Fargo Clinic.

The presence of a continuing disturbance in tubal physiology explains the high incidence of repeat ectopic pregnancy. Various studies have reported an incidence of 2½ to 14½ per cent for repeated ectopic pregnancy. The average series shows approximately 5 per cent repeat cases. This and the much higher than normal incidence in infertility patients point to 2 groups that should be given special attention. The incidence in the infertility group usually is about 6 times that of the general group.

Ectopic pregnancy must be accorded a place of considerable importance because of the difficulty which may be encountered in making an early diagnosis. Late recognition or lack of proper facilities for treatment must be eliminated if the maternal mortality from this cause is to be reduced. Between 8 and 10 per cent of all maternal deaths are ascribed to ectopic pregnancy, with a death rate in ectopic pregnancies of 1 in 150.

Symptoms are extremely variable but are generally distributed in the following groups:

1. Amenorrhea is usually present, but 8 to 10 per cent of patients have no history of a missed period.

2. Pain is a fairly constant finding and usually has its onset four to six weeks after the last menstrual period.

3. Nausea and vomiting may be accentuated over that of normal pregnancy.

4. Dizziness and weakness are present in 20 per cent of cases.

5. Bowel and bladder pressure are inconstant complaints.

6. Syncope is present in 25 per cent of patients.

7. Cramping or sharp lower abdominal pain is usually present in varying degrees.

8. Shock is present only in the more advanced cases in which rupture or tubal abortion leads to extensive intra-abdominal bleeding.

9. Abnormal vaginal bleeding is present in 85 to 90 per cent of patients with ectopic pregnancy. Bleeding may vary from spotty to heavy.

Laboratory findings are of little assistance, since the leukocyte count is normal or elevated, and the hemoglobin may be normal or markedly low depending on initial levels and magnitude and duration of bleeding. The pregnancy tests are not reliable and generally represent a waste of time when time of initiating definitive therapy is important. Physical findings are usually localized lower abdominal tenderness early and diffuse tenderness later. There may be a fullness in the cul-de-sac with or without a palpable adnexal mass. Colpocentesis may aid in the diagnosis, but aspiration of blood does not eliminate other causes of intra-abdominal bleeding, especially bleeding physiologic cysts which may present signs and symptoms very similar to tubal pregnancy. Failure to aspirate blood from the posterior cul-de-sac does not rule out unruptured tubal pregnancy.

There is pronounced difference of opinion concerning the advisability of performing incidental appendectomy at the time of treatment of ectopic pregnancy. Evidence exists to support the opinion that if the patient's general condition is good, incidental appendectomy can be done without appreciable increase in morbidity or mortality.

Our present study includes all ectopic tubal pregnancies treated over a nine-year period—1947 through 1956. Only those patients in whom the diagnosis was confirmed by tissue reports with microscopic evidence of pregnancy were included. There were 68 tubal pregnancies in 67 patients. The principal purpose was to compare the results of the earlier years with those of the last two or three years, when the majority of patients had diagnostic colpotomy followed by definitive surgical therapy via the colpotomy incision whenever possible. Unless some contra-indication to colpotomy is present, we routinely open the posterior cul-de-sac with a transverse incision large enough to permit palpation and visualization of the tubes and ovaries. It is

usually possible to deliver the tube through the colpotomy incision and to do a partial salpingectomy or to repair the tube if conservation of the tube seems desirable. Both tubes must be inspected, as the incidence of bilateral tubal pregnancy, while not common, is a very real possibility. The use of colpotomy for diagnosis and treatment whenever possible offers a much less formidable surgical procedure than exploratory laparotomy with a nearly completely painless and greatly shortened convalescence. The surgical risk is decreased and the hospital stay is, in most cases, less than one half as long as that for the patient who has undergone laparotomy for ectopic pregnancy. In this study, there was no maternal mortality. The morbidity was not evaluated because of lack of data in the records for the early years of the study. The morbidity of the patients treated by colpotomy was, however, much lower than that of those who had had laparotomy in the past two years of this study.

The ages of the patients ranged from 19 through 43 years. The incidence in the various groups as shown in table 1 is nearly identical with the age group distribution for numbers of live births. The parity and gravidity are shown in tables 2 and 3. The high incidence of ectopic pregnancy in primiparous patients probably reflects the relationships of tubal pregnancy with infertility and previous pelvic inflammatory disease. In this group, 12 patients revealed a history of 13 abortions prior to the tubal pregnancy. Infertility of one to eighteen years' duration was noted in 11 patients, or 16 per cent of the total group. History of pre-existing pelvic inflammatory disease was established by history and operative findings in 7 cases, or 10 per cent. There was a history of previous pelvic surgery in 15 patients, or 22 per cent. There were 3 patients

TABLE 1
Age distribution 68 patients

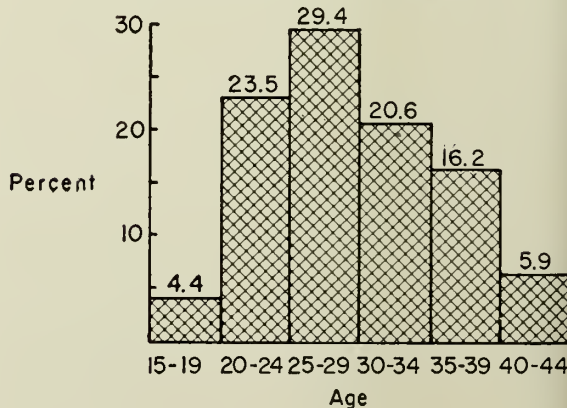


TABLE 2
Parity

Para	0	1	2	3	4	5
Number	20	18	17	4	2	5

* Two unknown

TABLE 3
Gravidity

Gravida	1	2	3	4	5	6	7
Number	16	15	20	8	1	5	1

* Two unknown

with a repeat tubal pregnancy for a percentage of 4.4 per cent. The reason for the difference in statistics on the number of repeat ectopic pregnancies and the totals reported in this series is because some of these patients were not under our supervision at the time of their first ectopic pregnancy. Factors of special interest and importance which may be confusing in establishing the diagnosis of tubal pregnancy were the following:

1. Three patients had had tuboplasty operations because of infertility.
2. Four tubal pregnancies occurred in single women.
3. One patient had a tubal pregnancy and a normal intrauterine pregnancy with normal delivery after partial salpingectomy.
4. One patient had had a postpartum tubal ligation five months before her tubal pregnancy.
5. One patient had 3 tubal pregnancies. The first was treated by right salpingo-oophorectomy, the second was a ruptured left tubal pregnancy treated by tuboplasty, and the third was a ruptured left tubal pregnancy treated by salpingectomy.

Pregnancy tests in tubal pregnancy are not reliable and seldom influence the choice of treatment. In this series, 11 pregnancy tests were done and, of these, 8 were negative, 2 positive, and 1 doubtful. The presenting symptoms in order of frequency are listed in table 4. History of amenorrhea varied from none in 10 patients to a maximum of three and one-half months. The physical finding was pronounced tenderness in the lower abdomen. There was a definite mass, palpable on bimanual examination, in 27 patients and cul-de-sac fullness without a definite adnexal mass in 10 patients. Blood pressure varied from 60/30 to normal. Temperatures were usually normal, with the highest 100.5° F. Pulse varied from 72 to 160 per minute. White blood cell counts ranged from 4,100 to 23,450, with an average of 10,850.

Diagnostic procedures and definitive surgery were as follows:

1. Colpotomy was done in 27 cases. It was

attempted in 1 patient and the procedure failed.

2. Culdoscopy was employed in 2 cases.

3. Dilatation and curettage were performed in 20 cases.

- a. Eleven had dilatation and curettage at the time of definitive surgery.

- b. Nine had dilatation and curettage at intervals of from eight hours to one month before the correct diagnosis was recognized.

4. Laparotomy without preliminary colpotomy was done in 37 patients. Some of these had a preliminary dilation and curettage.

5. Laparotomy after diagnostic colpotomy was carried out in 10 cases.

6. Colpotomy alone was used for diagnosis and as the means of exposure of the involved tube for definitive surgery in 18 patients.

In this series, there were 15 unruptured tubal pregnancies, 49 ruptured tubal pregnancies, and 4 tubal abortions. Of the patients with unruptured tubal pregnancy, 10 were treated by colpotomy without laparotomy. In all patients, both tubes were inspected and, except in those in whom the uninvolved tube was damaged or had been previously removed, the treatment was generally partial salpingectomy.

TABLE 4

Presenting Symptoms		No
1	Pain	57
2	Abnormal bleeding	53
3	Syncope	20
4	Shock	12
5	Shoulder pain	9
6	Nausea and vomiting	6
7	Anorexia	2

In 10 patients, the involved tube could be repaired and left in what was thought to be a satisfactory functional state.

All patients were given supportive treatment with blood transfusion, oxygen, antibiotics, or chemotherapy as indicated.

Of the 14 patients treated in the last year, 8 had colpotomy for diagnosis and treatment, and 3 had colpotomy followed by laparotomy because adequate exposure could not be accomplished through the colpotomy incision alone. In comparing the hospital stay and the clinical course of these patients, we have been more and more convinced that the colpotomy approach when used in properly selected patients is the procedure of choice. The patients with colpotomy alone averaged 4.4 days in the hospital compared to 7.0 days for those who had laparotomy. The uncomplicated colpotomy patient often leaves the hospital on the second or third post-

operative day. The clinical course is nearly painless, and the patients present much the same picture as is seen after dilatation and curettage or other minor vaginal pelvic procedures have been performed.

SUMMARY

A brief survey of the etiology and important factors in the diagnosis of tubal pregnancy is reviewed. The role of colpotomy as a diagnostic aid is re-emphasized, and the desirability of using the colpotomy approach for definitive surgery is pointed out. The principal benefits derived from this procedure are a positive diagnosis without subjecting the patient to laparotomy or prolonged observation and laboratory procedures, a much more comfortable postoperative period, and a reduced length of hospital stay in patients in whom the procedure can be safely accomplished via the vaginal approach.

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Upper Midwest Organizes to Meet Asian Influenza Threat

THE PUBLIC HEALTH SERVICES of North Dakota, Minnesota, and South Dakota have mobilized to meet the probability of the invasion of Asian influenza, a highly contagious, but rarely fatal disease. These states have their own diagnostic laboratories. Physicians have been selected to collect specimens of throat washings and blood serums of victims immediately upon outbreak in their areas and send them on to the laboratories for identification. Once the identity of the virus has been established in a particular area, the public will be warned and encouraged to get vaccinations. Because the whole program of vaccination has to be directed at the virus causing the outbreak, it is of the utmost importance that the strain be accurately identified, and a diagnostic laboratory is the only place in which this can be done.

The state departments of health, the United States Public Health Service, the World Health

Organization, and the American Medical Association will cooperate in a public educational program in newspapers and on television and radio. Physicians will be kept informed on the progress of the disease, and the public will be acquainted with the need for immunization. The new vaccine, which is predicted to be about 70 per cent effective after one shot, provides protection for about a year.

Approximately 4,000,000 doses of the vaccine should be available for civilians by mid-September, and a production goal of 60,000,000 doses by next February has been set. The Public Health Service recommends immunization priority for physicians and others in health services and for essential personnel in communications, transportation, utilities, food processing and distribution, and law enforcement. At present, plans are for private physicians to handle the vaccination program.

New Drugs in Psychiatry

JOHN H. YOUNG, M.D.

Jamestown, North Dakota

SINCE THE FRENCH SYNTHESIZED CHLORPROMAZINE in 1950 and found that this drug was of value in the treatment of mental and emotional disorders, there has been renewed hope that the answer to the ever-increasing populations in state hospitals could be solved with chemotherapy. This is not the first time such hope has been placed in one type of treatment. During the 1930's, a similar feeling arose about insulin coma, electric shock, and prefrontal lobotomy. However, with time, these types of treatment have been relegated to a less ambitious role. Soon after the first clinical reports of trials in state hospitals with chlorpromazine and reserpine, there was much enthusiasm, particularly in the lay press. The public was offered the new "miracle drugs in psychiatry" as a panacea for emotional and mental illness. Empirically, the drugs were eventually tried on all mental and neurologic illnesses which had not responded to other known therapies. In general, it was agreed that chlorpromazine and reserpine were effective in severe anxiety, agitated states, manic excitement, organic confusion, and acute schizophrenic patients. There was less agreement that these drugs did more than control excitement. With the initial successes, research was speeded up to find a drug more powerful than chlorpromazine and reserpine and with fewer side effects. One area of investigation was with the "model psychosis" produced with LSD-25 and mescaline. Azacyclonol (Frenquel) was found to be an effective agent that would block the hallucinations and acute sensory disturbances in the experimental psychosis.¹ Clinical trials were not so promising, although some investigators reported success in alleviating the hallucinations of acute schizophrenic reactions. In the spring of 1955, Selling's first paper on clinical studies with meprobamate (Miltown and Equanil) was published.² Promazine (Sparine) was investigated because it caused fewer side effects than chlorpromazine. Fractions of *Rauwolfia serpentina* other than reserpine were tried in an attempt to obtain equal tranquilization with less

undesirable side effects. Pharmaceutical companies competed with one another by offering tranquilizers combined with other drugs to offset the side effects. Because of the poor results with the tranquilizers in the depressions, investigations were turned to cerebral stimulants. Out of these studies have come such drugs as pipradol hydrochloride (Meratran) and methylphenidylacetate hydrochloride (Ritalin).

The numbers of patients desiring and, at times, demanding relief of anxiety and of mental suffering is attested to by the huge quantities of these drugs that have been sold. It is estimated that 8 to 10 million people have taken both chlorpromazine and meprobamate. In 1955, the North Dakota legislature appropriated \$25,000 for the specific purchase of chlorpromazine and similar drugs. This was at a time when the ultimate value of these agents was not known. It was soon found that this amount covered only about one-half of the cost of new drugs for the biennium. A patient rarely enters the State Hospital who has not been tried on one of these drugs by the family doctor. The number of scientific articles published monthly on the new drugs in psychiatry is staggering. The present discussion is, therefore, an attempt to present our experience with psychochemotherapy, hoping it may be of value to those in general practice.

CHLORPROMAZINE THERAPY

We have been using chlorpromazine since the summer of 1954 and have added other drugs as they have reached the market. As this drug has been in use the longest at our hospital, it has become our standard for other drugs in the major psychoses. As other tranquilizers have been tried, they have not been continued unless they compare favorably with chlorpromazine or present special advantages over it in regard to route of administration or side effects. Because of staff shortages, we have not conducted elaborate research studies or fully tabulated statistics. We have, however, had considerable experience in the clinical use of the compounds.

Chlorpromazine³ is still the most important drug in the treatment of the major psychoses. It belongs to the antihistamine series, although

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it has only mild antihistamine properties. Clinically, its greatest value has been found in the control of manic state, in acutely disturbed, assaultive, and destructive schizophrenics and in chronically disturbed or regressed patients. Patients in acute excitement are sometimes refractive to sedation with the barbiturates, and more than 15 gr. of Sodium Amytal has been used at times without producing an adequate quieting effect. Electroconvulsive therapy is sometimes of value, but patients in acute excitement sometimes require a number of convulsive treatments in the space of a few minutes to allay the excitement. With intramuscular administration of chlorpromazine, the patient is frequently able to be out of a quiet room and associating with others in twenty-four to forty-eight hours. This use alone has been a great boon to the care of mentally ill in state hospitals. Maintenance electroconvulsive treatments are no longer necessary. Occupational therapy, recreational therapy, nursing service, and other types of care so essential in long-term treatment of the mentally ill are now available for most patients.

In the disturbed men's ward, formerly referred to as the ward for the criminally insane, we previously had iron cages within seclusion rooms for the acutely disturbed patients. Camisoles, wristlets, and cuffs were used frequently. To maintain some semblance of order, patients were segregated, restrained, and encouraged to sit day after day on benches without any form of recreation. Some of the patients have been hospitalized for as many as forty years. The records are replete with instances in which rooms have been torn apart, assaultive outbursts have occurred, and, on one occasion, an attendant was beheaded by a patient. Today, there are no cages; no one is confined to a room for more than a few hours; wristlets and cuffs are no longer used. Occupational therapy has provided material for hooking rugs, ping-pong tables, punching bags, and such. About one-half of the patients attend dances, card parties, movies, and take part in other types of recreation with patients from other wards. Several of the chronically ill patients are working in the ward. Of course, the tranquilizing drugs are not the only thing new at the hospital. There have been vast improvements in both structure and staffing. With these changes, it is difficult to assess the true value of drugs such as chlorpromazine. In midsummer, a directive from the clinical director asked for some reduction in the amount of the tranquilizing drugs because of the high cost. The dosage was reduced in a number of patients on this ward and omitted in some in whom the effects

were not as noticeable. Within two days, the ward became more noisy; fights were more numerous; and the quiet rooms were filled with disturbed patients. The situation again became quiet when the drugs were used as before.

In using chlorpromazine to control the chronically disturbed patient, we occasionally see patients who were formerly regressed and deteriorated improve markedly in their appearance and behavior. One such example is a schizophrenic girl who was first committed to the State Hospital in 1940. She was given a course of insulin coma therapy and improved. She was paroled but returned in nine months in a more disturbed state than when first admitted. She was again treated with insulin coma and electroconvulsive therapy but without effect. For the next ten years, her prognosis was considered hopeless. She was one of the most disturbed patients in the hospital. She was untidy, in physical restraint most of the time, would not keep her clothes on, was assaultive, abusive, and required tube feeding. Within one month after starting to take chlorpromazine, she was up and about on the ward, relating well to others, helping in the kitchen, going to church, and she started corresponding with her family. She had little memory of the ten years of her illness, but she could remember quite well events prior to her hospitalization. We are still unable to determine which patients will respond to these drugs. This patient maintained her improvement while kept on a maintenance dose of chlorpromazine and was provisionally discharged to her family in July of last year. To date, we have not heard from her or the family but assume that, since she has not returned to the hospital, her adjustment has been satisfactory. Several other patients with similar behavior, but perhaps not as striking, have improved markedly on this drug and have been discharged on a maintenance dose. These patients are referred to their family physician for a medical follow-up. Only those patients whose symptoms return when the drug is discontinued are discharged on a maintenance dose.

Another major area of use for chlorpromazine in the State Hospital is in controlling agitation and confusion in the aged group. In senile psychosis, agitation, confusion, disturbance in sleep patterns, and, occasionally, delusions make nursing care and ward management a difficult problem. Usually, a smaller dose level of the drug is needed to adequately sedate the patient at night and promote a more cooperative state during the day. The tranquilizers, in general, are far superior to the barbiturates, as the latter frequently cause excitement and increase the con-

fusion of the senile patient. One complication their use in the senile state presents is the possibility of a cerebral vascular accident. Such possibilities are reduced by maintaining an even level of sedation rather than oversedating and then allowing the patient to become overactive.

Chlorpromazine offers excellent sedation for the excited, agitated, and delirious alcoholic patient. It is contraindicated in acute alcoholism, particularly if alcohol has been ingested shortly before admission. This is because of the potentiating effect that chlorpromazine has on alcohol. It should be used with extreme caution in debilitated chronic alcoholics because of the increased danger of vasomotor collapse. In the delirious or pre-delirious alcoholic, 25 mg. of chlorpromazine is administered intramuscularly; the patient is kept in a reclining position; and blood pressure is checked. This amount can be repeated in one hour if necessary. The patient sleeps for eight or more hours and can usually take soft foods and liquids on the following day.

In regard to dose levels and route of administration, we give intramuscular chlorpromazine only when the patient is acutely disturbed or uncooperative in taking the oral medication. This is given in 25- and 50-mg. amounts three times a day or as needed. As soon as the patient can take oral medication, the intramuscular injections are stopped, and the patient is transferred to the oral route. Usually, twice the amount is given orally as is given intramuscularly. Oral chlorpromazine is started at 25 mg. two to three times a day in the elderly or debilitated patient and 50 mg. two to three times a day in the average healthy adult. This amount is increased 50 to 100 mg. a day until the desired effects are produced. The usual dose levels for the disturbed patient are 400 to 600 mg. a day, although 100 to 300 mg. per day is the more common amount used. After the desired effect is produced, the level is gradually lowered to a maintenance dose, which is somewhere between 50 and 150 mg. per day. Depending upon the chronicity and severity of the illness, the maintenance amount is continued until the improvement is stabilized and is then slowly withdrawn. If symptoms return, the patient is again brought under control with the drug and maintained for an indefinite period on it. The highest amount we have used has been 3,200 mg. per day in an acutely disturbed patient. In chronic mental illnesses, improvement sometimes does not take place until the patient has been on medication for six months to a year. We have one such patient in a disturbed ward who wrote unintelligible letters, talked in an inco-

herent manner, and insisted that he was someone other than the person listed on our records. After eight months of medication, the patient began writing intelligent letters home and introducing himself to the ward doctor by his true name, stating that he had not previously met the doctor. Some time after this change occurred, the level of medication was reduced, and, soon after this, the patient handed the ward doctor a note asking that all those "insane" letters be destroyed as he didn't know who he was at that time. It was signed by the name he had assumed during his psychotic illness. The level of his medication was increased, and he again started writing letters home to his family.

In using chlorpromazine, certain side effects and complications must be watched for, as serious conditions can result from the use of this drug. The major complications are agranulocytosis and leukopenia, jaundice, skin sensitivity reactions, depression, and paradoxical excitement. The jaundice associated with chlorpromazine therapy has been shown to be on the basis of bile stasis rather than due to parenchymal damage. In a study conducted at this hospital, 219 patients on chlorpromazine therapy were reviewed and 4 instances of jaundice were found. This figure compares favorably with that reported elsewhere. We have seen several cases of agranulocytosis, but there have been no deaths at the State Hospital from this cause. Leukopenia occurs more frequently, but it clears up fairly rapidly after the drug is eliminated. We have one patient in whom a severe agranulocytosis developed, which cleared in several weeks after eliminating the drug and antibiotic therapy. This patient has been treated with chlorpromazine subsequently without the development of leukopenia. In a like manner, patients who have become jaundiced on the drug have been given chlorpromazine after the jaundice has cleared without a return of jaundice. Patients who are depressed and agitated might become more depressed on chlorpromazine therapy. This is particularly true in the involutional depressions in which agitation is the rule. The agitation can usually be controlled adequately with chlorpromazine, although electroconvulsive therapy is usually required to alleviate the depression. Chlorpromazine is generally considered of little value in the depression of manic-depressive illness. A patient rarely reacts with excitement to the tranquilizers. This is called paradoxical reaction. We had one such instance in which chlorpromazine and reserpine, even in high doses, caused the patient to become more excited. Skin rashes have been treated at times

effectively with antihistamines, although usually the patient has been taken off the drug or the amount of the drug has been reduced. We have found that patients on chlorpromazine are more sensitive to sunlight, and they are warned to keep the body covered while in the sun. Prior to the marketing of the liquids for recalcitrant patients, a sizeable number of the nursing personnel developed skin sensitivity to chlorpromazine, and 4 of the staff have been on Workmen's Compensation as a result of sensitivity to dermal contact from crushing the tablets prior to dissolving them. Because of disturbances in the temperature regulating mechanism, patients on chlorpromazine and reserpine must be protected from extreme heat. We had one incident in which a patient on chlorpromazine experienced a sudden elevation of temperature to 104.5° F. while working in a hot kitchen and a return to normal in several hours after leaving the kitchen. Lesser side effects which we have not found too troublesome are dizziness, drowsiness, lethargy, and vasomotor syncope. The latter is more common after intramuscular medication and is avoided by having the patient in a reclining position for one half hour after administration. In severe reactions, norepinephrine rather than epinephrine is indicated. Parkinson-like symptoms, consisting of stiffening of the muscles, a shuffling gait, drooling, and a mask-like facies, are seen particularly with the higher dosages, although this syndrome does not contraindicate further therapy with the drug if beneficial results are being obtained. It always reverses itself after the drug has been discontinued. The potentiating effect of chlorpromazine on hypnotics, anesthetic agents, and narcotics must be kept constantly in mind to avoid oversedation. One patient was admitted to the State Hospital who had previously been given an unknown quantity of a barbiturate. On admission, the patient did not appear to be sedated, was somewhat overactive, and the admitting physician did not know the patient had been given barbiturates prior to coming to the hospital. She was given chlorpromazine, lapsed into a deep coma, and did not recover. An autopsy permission was not obtained. It was presumed this was an instance of potentiation of a barbiturate with fatal results. Habituation or addiction has not been reported in regard to the use of chlorpromazine. Chlorpromazine does not produce euphoria. The patient usually requires less rather than greater amounts of the medication as the drug is continued, and physical dependence is not observed on withdrawal of the drug. Conversely, many hospitalized patients refuse to take the drug

and frequently deny any help from the medication in spite of pronounced improvement. One patient who had been abusive, vulgar, and had displayed a violent temper for many years was given a trial on chlorpromazine. He became cooperative, pleasant, and improved markedly in his relations with other patients and ward personnel. In spite of this improvement, he complained constantly that the medication was making him feel "funny in the head." He asked repeatedly to be taken off the drug. His request was granted, and he became angry, redfaced, spitting, and threatening. Medication was again started, once more he improved, and again he complained. It was felt that this reaction might be comparable to the epileptic patient who will omit medication in order to obtain relief from tension after the seizure.

In spite of newer tranquilizing drugs and these serious side effects accompanying chlorpromazine therapy, it still remains the drug of choice in the treatment of major psychotic illnesses. Its use has not eliminated electric shock treatment, but it has reduced the amount of electric shock given. It has aided in transforming regressed, disturbed psychiatric wards into relatively pleasant therapeutic hospital services.

RESERPINE THERAPY

Reserpine is the second major tranquilizer used. It is a purified alkaloid derivative of *Rauwolfia serpentina*, a drug used in India for centuries. Reserpine was first used clinically in psychotic states by Sainz but reported first by Kline and associates at the Rockland State Hospital, New York, in 1954.⁴ Indications for its use in hospitalized psychiatric patients are essentially the same as those for chlorpromazine. It is a potent agent and sedates acutely excited and assaultive patients if used in large enough amounts and if given intramuscularly. It is somewhat slower acting than chlorpromazine, although its effect appears to be more prolonged. We have used it in amounts of 14 mg. a day combining the oral and intramuscular routes of administration. Schizophrenics are given increasingly larger amounts until a reversal of the psychotic process is brought about. The amounts of medication are then gradually reduced to a maintenance level, which is usually in the 1 to 2 mg. a day range. One patient who has epilepsy with psychosis becomes delusional, assaultive, and destructive if a maintenance dose less than 8 mg. a day orally is given. On this large amount, he is not overly sleepy, remains active during the day, and has developed no unpleasant side effects. With the hospitalized

psychiatric patient, the most frequent unpleasant side effect is the Parkinson-like syndrome. As mentioned previously, this picture reverses itself if the drug level is reduced or the drug withdrawn. Depression is reported in the literature as a serious complication of reserpine therapy. However, in the hospital population, depression as a complication has not been frequent. Reserpine has also been shown to increase gastric secretion and gastric acidity. Relatively small amounts, that is, 0.5 mg. per day, have produced massive gastrointestinal hemorrhage or perforations of an ulcer in less than two weeks' time. We have not experienced this complication with inpatients, although one outpatient developed massive intestinal hemorrhage from a peptic ulcer approximately six weeks after reserpine therapy was started with 0.5 mg. per day. Many other complications from reserpine therapy have been reported, such as retention of body fluids with cardiac decompensation in cardiac patients previously well compensated. Premature ventricular beats, particularly in digitalized patients, have been reported. We have not observed these conditions either. Reserpine is exceeded in use only by chlorpromazine at our hospital.

PROMAZINE THERAPY

Promazine (Sparine) was initially reported to have tranquilizing properties equal to chlorpromazine without serious side effects.⁵ Clinical opinion in our hospital is that promazine is a milder tranquilizer than chlorpromazine, but it does enjoy one major advantage over chlorpromazine in that it can be administered intravenously to an acutely disturbed patient. The most active patient is quickly sedated after intravenous administration of 100 to 150 mg., and a deep, though natural, sleep follows lasting eight to fourteen hours. There apparently is no potentiation of hypnotics, narcotics, or anesthetic agents with promazine, and it does not appear to increase depression as chlorpromazine may. No incidents of agranulocytosis were reported with promazine until December 1956.⁶ There were previous warnings to the effect that this drug is capable of producing such a reaction. We have recently had 2 patients on 300 mg. of oral promazine in whom grand mal seizures developed. These patients had no previous history of seizures and have had none since medication was omitted. We have used the intravenous preparation in acute overactive alcoholics either bordering on delirium tremens or in delirium tremens with excellent results. The patient is usually over the acute symptoms when he awakens from the sleep. With hospitalized patients, the

intravenous preparation of promazine holds considerable promise.

OTHER DRUG THERAPY

In regard to other tranquilizers used with psychotic patients, our results have in no way compared with the results mentioned above. We have had little or no success with Azacyclonol (Frenquel). Phenegan was tried on 25 patients, as this drug was reported to be an effective tranquilizer without serious side effects, but results were not rewarding. Mepazine (Pacatal), a phenothiazine, is being used at present on an experimental basis, although about three-fourths of the patients report visual disturbances in near vision.

One other area of drug therapy that appears to hold some promise is that of the newer cerebral stimulants. Several of these have been released in the last year or so. However, the only one with which we have had much clinical experience is methyl-phenidylacetate hydrochloride (Ritalin). This drug does not have pronounced side effects, does not elevate the blood pressure appreciably, and does not have the autonomic nervous system effects of d-amphetamine sulfate. We have found it of particular value in overcoming the depressions related to the tranquilizers and in treating mild depressive reactions along with schizoid depressions. Attempts to achieve effective results in depressions of manic-depressive illness have not been encouraging. A recent report states that this drug is being used intravenously in depressed patients with some success.

The discussion above centers largely around the use of the newer drugs in psychiatry in hospitalized patients. They are also used, usually in smaller dosages, in patients seeking relief of symptoms who are not hospitalized. In the outpatient department of the State Hospital at Jamestown, we have treated approximately 50 outpatients with one or more of the tranquilizing drugs. Our results, in general, have not been as encouraging as with inpatients, although 60 per cent of these patients have shown some improvement. We have had difficulty in getting the patient to adhere to prescription orders for various reasons. Some complain of sleepiness even though they were told they could expect this side reaction and that it probably would not last longer than a couple of weeks. Others have complained that they were afraid to have the drug around the house for fear they would attempt suicide with it. They did not change their attitude even when told that all reported attempts of suicide with these drugs have been futile. We have had several patients who improve initially on these drugs and then become quite upset to

find that they are losing the very defenses that enabled them to deal effectively with those about them. They discontinue the drug prematurely, stating it has not benefited them. For this reason, we prefer to have patients with more severe reactions hospitalized during the initial treatment and then followed on an outpatient basis after their symptoms are stabilized.

In regard to the less seriously disturbed psychiatric patients, those who do not require inpatient care, meprobamate has been our most effective tranquilizer. It was synthesized in 1950 and is derived from and is similar to mephenesin, a muscular relaxant. Meprobamate retains the muscle relaxant properties and has a longer duration of action than mephenesin.⁷ It is most effective in anxiety and tension states, promoting sleep and relieving some of the symptoms associated with anxiety and tension. Other reported conditions in which it has been used are to reduce tension in alcoholics who are attempting to abstain from alcohol, in menstrual distress, neurodermatitis, behavior problems in children, and as an anticonvulsant in the petit mal attacks. Initial reports indicated that it was particularly free from toxic side effects in that it did not seem to affect the autonomic nervous system, and toxicity studies in animals revealed that it was 4 to 5 times less toxic than the barbiturates. As its use has increased, several serious reactions have been reported. Skin lesions ranging from a mild pruritic, urticarial rash, which is generalized or confined to the groin area, chest, and flexor surfaces of the arm, to severe allergic reactions, have been reported. In the latter cases, there may be associated fever, fainting, angioneurotic edema, and bronchial spasm, which complicate the skin picture. These reactions are unique in that they may appear after the first administration of the drug without prior sensitization. They usually appear after the first to fourth tablets are taken. Other complications are paradoxical excitement, intestinal hyperperistalsis with rice-water stools, and extraocular palsy.⁸ Lemere,⁹ in Seattle, Washington, reported cases of 6 patients, all alcoholic or drug addicts, who over-medicated themselves with meprobamate, taking as many as 20 tablets a day, and showed some

withdrawal symptoms when taken rapidly off of the drug. One of these patients had a convulsion. No cases have yet been reported of agranulocytosis, jaundice, liver or kidney disease, or a Parkinson-like syndrome. In the outpatient clinic, we have experienced none of these adverse reactions, although a sizable number of neurotic patients have become somewhat dependent on the drug, since it offers them relief from tension and anxiety that they have not yet been able to acquire through psychotherapy. We have encouraged most patients to gradually reduce the amount of medication they are taking after two to three months and then discontinue the medication completely shortly after that time. Considering the vast numbers that have been treated with this drug, the few reported cases of adverse side reactions should not contraindicate its use when needed to relieve suffering. But, as meprobamate is still a new tranquilizer, care should be used.

Thus far, I have reviewed our experiences with some of the newer drugs in psychiatry. The question then arises, "Why, if these drugs work so well in a state hospital, will they not work as well in general hospitals or in office practice?" One answer is that the total setting is important. Another reason is that some of their success depends upon the skill with which they are administered. Probably, one of the most common mistakes is in not giving the patient an adequate amount of the drug. The toxicity of the tranquilizers in general is extremely low. One case is reported of a 20-month-old infant who, after ingesting 240 mg. of reserpine, only became drowsy.¹⁰ Other instances are reported of attempted suicides with chlorpromazine, meprobamate, and other drugs, which resulted only in drowsiness. The major complications of sensitivity reactions, blood dyscrasias, and jaundice do not depend on the quantity of the drug used, as these reactions have been reported on small dosages. Amounts sufficient to achieve the desired effects should be used. The drug should not be abandoned if the patient is not relieved in twenty-four hours. More chronic reactions require a longer period of medication before improvement is noted. Most important is to know the patient's total problem and to treat him in the light of this problem.

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Sweat Gland Abscesses of Infancy

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IN BABIES, the openings of the excretory ducts of the sweat or sudoriferous glands are easily invaded by staphylococci. Each gland¹ consists of a secretory portion, or body, situated in the deeper part of the corium or in the subcutaneous fat and an excretory duct, which opens on the surface of the skin by a funnel-shaped mouth. Sweat gland abscesses² usually occur in the occipital region, back, and buttocks. They are extremely rare in later childhood, when the hair follicles become susceptible to infection. The absence of the tough core of the furuncle and the absence of the clinically obvious center through which the abscess points are the pathognomonic signs of the sweat gland abscess.³ The boggy fluctuating lesion is dome-shaped rather than conical, and spontaneous rupture or incision produces a rather liquid pus without necrotic plug.

Histologic study of a sweat gland abscess, reported by Mopper and associates,³ disclosed subacute, almost granulomatous inflammation involving the deepest parts of the corium and the superficial layer of fat tissue centering around the sweat coils. Leukocytes and histiocytes constituted the bulk of the infiltrate. None of the sweat ducts possessed a patent lumen, but their epithelium was well preserved in contrast to that of the sweat coils. The intra-epidermal part of one sweat duct contained several leukocytes and some granular material but no bacteria. Cocci could be demonstrated in the purulent exudate surrounding one of the sweat coils.

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CASE REPORT

L. J. was a 3-month-old white child on whose scalp lesions, which were thought to be boils, developed at the age of 2 months. These were treated by a topical medication, and some of them ruptured spontaneously. I first saw her at the age of 3 months when the scalp, especially the occipital area and the posterior neck area, was covered with dome-shaped fluctuant swellings. These swellings were not red, and they contained no obvious "pointing" areas. The eyes, ears, nose, and throat were benign. The heart and lungs were clear. The abdomen and the extremities were normal. The temperature was 100° F. rectally. The weight was 12 lb. and 3 oz. The hemoglobin was 10.8 gm. The white blood count was 16,200 with polymorphonuclear neutrophil leukocytes 39 per cent and lymphocytes 59 per cent. A chest roentgenogram was negative. A tuberculin test was negative. The hair was shaved from the scalp and Sterosan cream was applied. Penicillin and Chloromycetin were given intramuscularly. The fluctuant areas of the occipital and neck area were incised. No necrotic plugs were seen. Culture of the abscess contents showed a hemolytic Staphylococcus. No new abscesses appeared after the eighth hospital day. She was given 5 doses of staphylococcus toxoid at weekly intervals starting with 0.1 cc. and increasing to 0.5 cc. Although no biopsies were performed here, the description and clinical picture suggest multiple sweat gland abscesses.

SUMMARY

Multiple sweat gland abscesses were found in a 3-month-old baby. They disappeared after incision, drainage, chemotherapy, and a course of staphylococcus toxoid.

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Liver, Biliary Tract and Pancreas, from the Ciba Collection of Medical Illustrations, Vol. 3, Part III, prepared by FRANK H. NETTER, M.D.; edited by ERNST OPPENHEIMER, M.D., 1957. Summit, New Jersey: Ciba Pharmaceutical Products, Inc. \$10.50.

This is the third in a series of Ciba's Collections. Previous volumes described the nervous system and reproductive tract. Part III of Volume 3, concerning the liver, biliary tract and pancreas will be followed shortly by Part I, which will portray the upper alimentary tract, while Part II will describe the remaining portions of the digestive tract and the peritoneal cavity.

This "Collection" does not purport to be all-inclusive. It is nevertheless a comprehensive description, greatly enhanced by Dr. Netter's two- and three-dimensional drawings. The text has contributions by such authorities as Dr. Hans Popper, Dr. Oscar Bodansky, Dr. Eugene Clifton, Dr. Donald Kozall, and Dr. Victor Shorov.

The embryology, anatomy, topographic anatomy, congenital and other anomalies, and physiology of these organs are described briefly, yet accurately. In sections relating to the various diseases to which these organs are prone, the pathologic descriptions are well correlated with delineations of the pathogenesis, pathophysiology, clinical manifestations, laboratory tests and interpretations, and treatment—although discussions concerning therapy are limited, for obvious reasons, to a few generalizations.

This book is not intended as a substitute for any of the more comprehensive texts and monographs on the subject but, with Dr. Netter's graphic expositions of the infinitely various aspects of the subject, no more lucid description is necessary for the student and practitioner in reviewing these anatomic systems. Should the reader wish further information, a short but comprehensive bibliography follows the text. The color engravings and typography are of excellent quality throughout the volume, which can be secured by direct order from Ciba Pharmaceutical Products, Inc., Summit, New Jersey.

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Clinical Management of Renal Failure, by MAURICE B. STRAUSS, M.D., and LAWRENCE G. RAISZ, M.D., 1956. Springfield, Illinois: Charles C Thomas. \$2.75.

In this monograph on the clinical management of renal failure, the latter is defined "as the inability of the kidney, because of intrinsic or extrinsic factors, to carry out its two main functions: (1) the maintenance of a relatively constant composition and volume of the internal environment of the organism, and (2) the removal of certain end products of catabolism which are no longer required by the body." The method of presenting material includes the citation of illustrative clinical cases. The review of the pathologic physiology of acute renal failure helps to clarify its treatment and correction of specific fluid and electrolyte dislocation. Consideration of artificial methods of treatment includes discussion of external dialysis. The authors have very well attained their attempt "to outline the physiologic consequences of organic or functional pathology of the urinary system and, thus, make clear the foundation upon which rest rational methods of treatment for renal failure, both acute and chronic."

C. A. MCKINLAY, M.D.

The Nonvenereal Diseases of the Genitals, by FRITZ T. CALLOMON, M.D., and JOHN F. WILSON, M.D., 1956. Springfield, Illinois: Charles C Thomas, 382 pages. \$12.50.

This book presents the etiology, differential diagnosis, and therapy of genital diseases which are not related to syphilis, chancroid, or gonorrhea. The differential diagnosis and treatment of both the common and rare diseases are considered. Regional dermatology is considered in detail and is especially valuable when genital lesions are the only

ones present. Diseases of all penile tissues, including the corpora cavernosa, urethra, scrotum, testicles, and external genitals of the female are presented. This book brings together material from all the special fields, which includes urology, dermatology, gynecology, internal medicine, and others necessary to diagnose a disease of the genitals. There are numerous black and white illustrations. A good subject index is included, and references to the literature are given at the end of each chapter. Especially, as an aid to the differential diagnosis of diseases of the genitals, this book is highly recommended.

HUGO E. MILLER, M.D.

Management of Addictions, edited by EDWARD POPOLSKY, M.D., 1955. New York: Philosophical Library. \$7.50.

This book is a collection of 35 undated articles on the addiction to certain drugs. The articles are by various authors, authorities in their fields, and reprinted in this book by permission of the editors of the various journals in which the articles appeared. The book is divided into 2 parts; part 1 contains 26 articles devoted to alcohol addiction; part 2 contains 9 articles covering addiction to other drugs.

Various concepts are presented and methods discussed, for example, the concept of genotrophic disease and the use of antabuse and the conditioned-reflex method of treatment. The subject of addiction to drugs is complicated and is continually changing. The use of tranquilizing drugs and the acceptance of alcoholism as a disease by the American Medical Society will, no doubt, affect the attitudes and therapeutic regimens associated with addiction. A book of this type serves a useful purpose in summarizing the current thinking on this problem.

The book is of interest to the general physician, internist, psychologist, sociologist, and the political scientist who is curious about the reaction between the individual and his environment. It has limited value as a reference work, since those working in this field are acquainted with the most recent methods of therapy.

HERBERT W. JONES, JR., M.D.

Transactions of the North Dakota State Medical Association

Seventieth Annual Meeting

Fargo, North Dakota, May 25, 26, 27, and 28, 1957

OFFICERS

President	R. H. WALDSCHMIDT, Bismarck
President-Elect	R. W. RODGERS, Dickinson
First Vice-President	O. A. SEDLAK, Fargo
Second Vice-President	J. C. FAWCETT, Devils Lake
Speaker of the House	G. A. DODDS, Fargo
Vice-Speaker of the House	R. E. LEIGH, Grand Forks
Secretary	E. H. BOERTH, Bismarck
Treasurer	E. J. LARSON, Jamestown
Delegate to the A.M.A.	W. A. WRIGHT, Williston
Alternate Delegate to the A.M.A.	T. E. PEDERSON, Jamestown

COUNCILLORS

Terms expiring 1957

Fourth District	A. D. McCANNEL, Minot
Fifth District	W. H. GILSDORF, Valley City
Tenth District	KEITH VANDERGON, Portland

Terms expiring 1958

Second District	G. W. TOOMEY, Devils Lake
Seventh District	R. D. NIERLING, Jamestown
Ninth District	A. R. GILSDORF, Dickinson
Eighth District	J. D. CRAVEN, Williston

Terms expiring 1959

First District	V. G. BORLAND, Fargo
Third District	N. A. YOUNGS, Grand Forks
Sixth District	C. H. PETERS, Bismarck

Councillor at large

D. J. HALLIDAY	Kenmare
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COUNCIL: Officers

A. R. GILSDORF, Chairman
R. D. NIERLING, Vice-Chairman
W. H. GILSDORF, Secretary

COUNCIL: Executive Committee

A. R. GILSDORF
R. D. NIERLING
W. H. GILSDORF

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Terms expiring 1957

J. C. FAWCETT	Devils Lake
R. O. GOEHL	Grand Forks
W. A. WRIGHT	Williston

Terms expiring 1958

C. A. ARNESON	Bismarck
W. E. G. LANCASTER	Fargo
V. J. FISCHER	Minot

Terms expiring 1959

JOSEPH SORKNESS	Jamestown
O. W. JOHNSON	Rugby
H. L. REICHERT	Dickinson

HOUSE OF DELEGATES

FIRST DISTRICT

DAVID JAEHNING	Wahpeton
L. E. WOLD	Fargo
F. A. DE CESARE	Fargo
E. M. HAUGRUD	Fargo
F. M. MELTON	Fargo
J. S. GILLAM	Fargo
E. J. BEITHON, alternate	Wahpeton
R. D. STORY, alternate	Fargo
B. F. AMIDON, alternate	Fargo
C. M. HUNTER, alternate	Fargo
JAMES HOUGHTON, alternate	Fargo
M. H. POINDEXTER, alternate	Fargo

SECOND DISTRICT

W. R. FOX	Rugby
R. M. FAWCETT	Devils Lake
J. H. MAHONEY, alternate	Devils Lake
D. W. PALMER, alternate	Cando

THIRD DISTRICT

FRANK HILL	Grand Forks
ROBERT PAINTER	Grand Forks
BRUCE BOYNTON	Grafton
W. C. DAILEY	Grand Forks
R. E. MAHOWALD, alternate	Grand Forks
G. L. COUNTRYMAN, alternate	Grafton

FOURTH DISTRICT

A. R. SORENSON	Minot
F. D. NAEGELI	Minot
A. F. HAMMARGREN	Harvey
FRED ERENFELD	Minot
V. J. FISCHER	Minot
O. S. UTHUS, alternate	Minot
B. Z. HORDINSKY, alternate	Drake
S. E. SHEA, alternate	Minot
W. B. HUNTLEY, alternate	Minot
J. L. DEVINE, JR., alternate	Minot

FIFTH DISTRICT

G. CHRISTIANSON	Valley City
N. A. MACDONALD, alternate	Valley City

SIXTH DISTRICT

CARL BAUMGARTNER	Bismarck
M. S. JACOBSON	Elgin
R. W. HENDERSON	Bismarck
R. B. TUDOR	Bismarck
M. E. NUGENT	Bismarck

SEVENTH DISTRICT

T. E. PEDERSON	Jamestown
JOHN VAN DER LINDE	Jamestown
R. O. SAXVIK, alternate	Jamestown
JOHN ELSWORTH, alternate	Jamestown

EIGHTH DISTRICT

A. K. JOHNSON	Williston
DEAN STRINDEN, alternate	Williston

NINTH DISTRICT

K. G. FOSTER	Dickinson
R. F. GILLILAND	Dickinson
JULIAN TOSKY, alternate	Hebron
ADOLFS CURISKIS, alternate	New England

TENTH DISTRICT

ROBERT MC LEAN	Hillshoro
MERVIN ROSENBERG, alternate	Hatton

COMMITTEES: HOUSE OF DELEGATES

Seventieth Annual Meeting

STANDING COMMITTEES

Committee on Medical Education:

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T. E. PEDERSON	Jamestown
T. H. HARWOOD	Grand Forks
R. F. GILLILAND	Dickinson
L. H. KERMOTT, JR.	Minot
J. H. MAHONEY	Devils Lake
P. O. DAHL	Bismarck
F. D. NAEGELI	Minot
W. E. G. LANCASTER	Fargo
R. E. LEIGH	Grand Forks
ROBERT PAINTER	Grand Forks
D. J. HALLIDAY	Kenmare

Committee on Necrology and Medical History:

E. H. BOERTH, Chairman	Bismarck
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H. E. FRENCH	Grand Forks
R. E. LEIGH	Grand Forks
JAMES HOUGHTON	Fargo
KEITH VANDERGON	Portland

Committee on Legislation:

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H. L. REICHERT	Dickinson
J. N. ELSWORTH	Jamestown

C. A. ARNESON	Bismarek	R. O. SAXVIK	Jamestown
G. CHRISTIANSON	Valley City	L. E. WOLD	Fargo
W. E. G. LANCASTER	Fargo	W. C. HURLY	Minot
L. F. PINE	Devils Lake	<i>Committee on Maternal and Child Welfare:</i>	
P. H. WOUTAT	Grand Forks	R. E. LUCY, Chairman	Jamestown
C. H. PETERS	Bismarek	M. M. HEFFRON	Bismarek
A. K. JOHNSON	Williston	J. H. MOORE	Grand Forks
ROBERT MCLEAN	Hillsboro	L. G. PRAY	Fargo
A. R. SORENSON	Minot	JOHN GILLAM	Fargo
DAVID JAEHNING	Wahpeton	R. T. GAMMELL	Kenmare
<i>Committee on Public Relations:</i>		<i>Committee on Crippled Children:</i>	
JOHN CARTWRIGHT, Chairman	Bismarek	PAUL JOHNSON, Chairman	Bismarek
AMOS GILSDORF	Dickinson	C. W. HOGAN	Jamestown
R. O. GOEHL	Grand Forks	A. E. CULMER, JR.	Grand Forks
W. H. GILSDORF	Valley City	D. T. LINDSAY	Fargo
JOSEPH CRAVEN	Williston	H. J. FORTIN	Fargo
V. J. FISCHER	Minot	B. A. MAZUR	Fargo
KEITH VANDERGON	Portland	L. B. SILVERMAN	Grand Forks
RALPH MAHOWALD	Grand Forks	C. G. JOHNSON	Rugby
T. E. PEDERSON	Jamestown	J. C. SWANSON	Fargo
G. W. TOOMEY	Devils Lake	F. L. BEHLING	Fargo
<i>Committee on Official Publication:</i>		R. B. TUDOR	Bismarek
E. H. BOERTH, Chairman	Bismarek	J. J. MC LEOD	Grand Forks
W. M. BUCKINGHAM	Elgin	<i>Committee on Mental Health:</i>	
P. L. BLUMENTHAL	Mandan	JOHN FREEMAN, Chairman	Jamestown
<i>Committee on Public Health:</i>		L. A. CHRISTOFERSON	Fargo
PERCY OWENS, Chairman	Bismarek	R. D. NIERLING	Jamestown
T. Q. BENSON	Grand Forks	J. T. CARTWRIGHT	Bismarek
C. O. MC PHAIL	Crosby	M. J. GEIB	Moorhead, Minnesota
C. C. SMITH	Mandan	G. D. ICENOGLE	Bismarek
D. H. LAWRENCE	Fargo	L. H. KERMOTT, JR.	Minot
FRANK WHEELON	Minot	L. B. FROKE	Grand Forks
A. F. HAMMARGREN	Harvey	GEORGE VIGELAND	Rugby
C. L. LOEB	San Haven	<i>Committee on Diabetes:</i>	
R. F. GILLILAND	Dickinson	E. A. HAUNZ, Chairman	Grand Forks
AUGUST ORR	Bismarek	A. K. JOHNSON	Williston
<i>Committee on Cancer:</i>		R. M. FAWCETT	Devils Lake
C. M. LUND, Chairman	Williston	H. A. LA FLEUR	Mayville
G. W. HUNTER	Fargo	P. ROY GREGWARE	Bismarek
L. W. LARSON	Bismarek	T. E. PEDERSON	Jamestown
E. J. LARSON	Jamestown	MARTIN HOCHHAUSER	Garrison
R. W. RODGERS	Dickinson	DONALD BARNARD	Fargo
W. E. G. LANCASTER	Fargo	W. H. GILSDORF	Valley City
O. W. JOHNSON	Rugby	<i>Committee on Scientific Program:</i>	
T. H. HARWOOD	Grand Forks	Appointment expiring 1957	
GALE RICHARDSON	Minot	C. O. MC PHAIL	Crosby
W. H. GILSDORF	Valley City	ROBERT FAWCETT	Devils Lake
<i>Committee on Medical Economies:</i>		Appointment expiring 1958	
TED KELLER, Chairman	Rugby	F. D. NAEGELI	Minot
V. J. FISCHER	Minot	W. E. G. LANCASTER	Fargo
E. J. LARSON	Jamestown	Appointment expiring 1959	
C. H. PETERS	Bismarek	F. A. HILL	Grand Forks
R. W. RODGERS	Dickinson	P. ROY GREGWARE	Bismarek
JOSEPH CRAVEN	Williston	SPECIAL COMMITTEES	
V. G. BORLAND	Fargo	<i>Committee on Geriatrics and Rehabilitation:</i>	
C. B. PORTER	Grand Forks	T. H. HARWOOD, Chairman	Grand Forks
E. J. BEITHON	Wahpeton	R. O. SAXVIK	Jamestown
E. G. VINJE	Hazen	G. G. THORGRIMSEN	Grand Forks
<i>Committee on Veterans Medical Service:</i>		C. W. SCHOREGGE	Bismarek
A. C. FORTNEY, Chairman	Fargo	PAUL JOHNSON	Bismarek
R. W. HENDERSON	Bismarek	JACK REVERE	Grand Forks
AMOS GILSDORF	Dickinson	A. G. SATHE	Williston
PERRY TRIGGS	Fargo	NEIL MAC DONALD	Valley City
<i>Committee on Prepayment Medical Care:</i>		<i>Committee on Foreign Trained Physicians:</i>	
C. H. PETERS, Chairman	Bismarek	C. J. GLASPEL, Chairman	Grafton
T. E. PEDERSON	Jamestown	J. C. FAWCETT	Devils Lake
V. J. FISCHER	Minot	JOSEPH SORKNESS	Jamestown
FRANK DE CESARE	Fargo	O. W. JOHNSON	Rugby
W. E. G. LANCASTER	Fargo	W. A. WRIGHT	Williston
W. A. WRIGHT	Williston	<i>Committee on Emergency Medical Service:</i>	
H. L. REICHERT	Dickinson	ROBERT NUESSELE, Chairman	Bismarek
C. J. GLASPEL	Grafton	RALPH MAHOWALD	Grand Forks
GEORGE HART	Minot	C. G. JOHNSON	Rugby
LOUIS SILVERMAN	Grand Forks	J. L. DEVINE, JR.	Minot
<i>Committee on Rural Health:</i>		ROBERT GILLILAND	Dickinson
K. G. VANDERGON, Chairman	Portland	J. D. LE MAR	Fargo
STEPHEN BACHELLER	Enderlin	R. D. NIERLING	Jamestown
CLARENCE MARTIN	Kensal	R. O. SAXVIK	Jamestown
M. S. JACOBSON	Elgin	C. M. LUND	Williston
W. R. FOX	Rugby	ROBERT KLING	Bismarek
L. T. LONGMIRE	Devils Lake	GALE RICHARDSON	Minot
JAMES MOSES	Richardton	<i>Committee on American Medical Education Foundation:</i>	
<i>Committee on Nursing Education:</i>		W. E. G. LANCASTER, Chairman	Fargo
C. A. ARNESON, Chairman	Bismarek	K. G. VANDERGON	Portland
LLOYD RALSTON	Grand Forks	G. CHRISTIANSON	Valley City
AMOS GILSDORF	Dickinson		
T. E. PEDERSON	Jamestown		

KEITH FOSTER	Dickinson
L. W. LARSON	Bismarck
J. W. JANSONIUS	Jamestown
RUDOLPH FROESCHLE	Hazen
C. C. BORRUD	Williston
D. J. HALLIDAY	Kenmare
MYRON GOUGHNOUR	Bismarck
T. H. HARWOOD	Grand Forks
<i>Committee on Constitution and By-Laws:</i>	
R. B. RADL, Chairman	Bismarck
G. A. DODDS	Fargo
E. H. BOERTH	Bismarck
<i>Committee on School Health:</i>	
R. W. MCLEAN, Chairman	Hillsboro
O. W. JOHNSON	Rugby
W. H. GILSDORF	Valley City
PERCY OWENS	Bismarck
J. H. CLARK	Minot
R. F. GILLILAND	Dickinson
ELLIS OSTER	Ellendale
L. B. SILVERMAN	Grand Forks
<i>Committee on Interprofessional Relations:</i>	
Liaison officer to the North Dakota Optometrists	
M. E. NUGENT	Bismarck
Liaison officer to the North Dakota Hospital Association	
R. O. SAXVIK	Jamestown
Liaison officer to the North Dakota State Bar Association	
PAUL JOHNSON	Bismarck
Liaison officer to the North Dakota Pharmaceutical Association	
G. A. DODDS	Fargo
<i>Medical Center Advisory Council:</i>	
Member: P. H. WOUTAT	
	Grand Forks
<i>Governor's Health Planning Committee:</i>	
Member: P. H. WOUTAT	
	Grand Forks
<i>State Health Council:</i>	
Members: O. W. JOHNSON	
	Rugby
R. F. GILLILAND	Dickinson
<i>Liaison Committee on Public Information:</i>	
Representatives for the North Dakota State Medical Association	
MARLIN JOHNSON	Bismarck
H. L. REICHERT	Dickinson
<i>Commission for the Improvement of Patient Care in North Dakota:</i>	
Representatives for the North Dakota State Medical Association	
A. R. GILSDORF	Dickinson
R. O. SAXVIK	Jamestown
<i>Advisory Committee to Public Assistance Division of the State Welfare Board:</i>	
Representatives for the North Dakota State Medical Association	
E. J. LARSON	Jamestown
R. W. RODGERS	Dickinson
E. T. KELLER	Rugby

REFERENCE COMMITTEES

<i>1. To consider reports of President, Secretary, Executive Secretary, and Treasurer:</i>	
W. R. FOX, Chairman	Rugby
FRED ERENFELD	Minot
DAVID JAEHNING	Wahpeton
M. E. NUGENT	Bismarck
DEAN STRIDEN	Williston
<i>2. To consider reports of the Council, Councillors, and Special Committees, including the Committee on Constitution and By-Laws:</i>	
BRUCE BOYNTON, Chairman	Grafton
R. M. FAWCETT	Devils Lake
J. S. GILLAM	Fargo
ROBERT GILLILAND	Dickinson
<i>3. To consider report of the Delegate to the A.M.A., Medical Center Advisory Council, and Committee on Medical Education:</i>	
K. G. FOSTER, Chairman	Dickinson
W. C. DAILEY	Grand Forks
R. W. MCLEAN	Hillsboro
R. B. TUDOR	Bismarck
L. E. WOLD	Fargo
<i>4. To consider reports of Standing Committees, except Committee on Medical Education and Committee on Medical Economics:</i>	
A. F. HAMMARGREN, Chairman	Harvey
A. R. SORENSON	Minot
ROBERT PAINTER	Grand Forks
J. M. VAN DER LINDE	Jamestown

<i>5. To consider reports of Committee on Medical Economics, including Committee on Veterans Medical Service, Committee on Prepayment Medical Care, and Committee on Rural Health:</i>	
CARL BAUMGARTNER, Chairman	Bismarck
G. CHRISTIANSON	Valley City
FRANK HILL	Grand Forks
V. J. FISCHER	Minot
FRANK MELTON	Fargo
<i>6. Committee on Resolutions, to include new business:</i>	
T. E. PEDERSON, Chairman	Jamestown
F. A. DE CESARE	Fargo
R. W. HENDERSON	Bismarck
F. D. NAEGLI	Minot
<i>7. Committee on Credentials:</i>	
JAMES HOUGHTON, Chairman	Fargo
M. S. JACOBSON	Elgin

PROCEEDINGS OF THE HOUSE OF DELEGATES of the North Dakota State Medical Association Seventieth Annual Meeting

The first session of the House of Delegates of the North Dakota State Medical Association was called to order by the Speaker of the House, Dr. G. A. Dodds, at 4:00 P.M. at the Gardner Hotel, Fargo, North Dakota, May 25, 1957.

Speaker Dodds requested the chairman of the Credentials Committee for his report and Dr. James Houghton, chairman, reported that a quorum was present and all credentials were in order. The secretary, Dr. E. H. Boerth, called the roll and the following delegates responded:

David Jaehning, Wahpeton; L. E. Wold, Fargo; F. A. DeCesare, Fargo; F. M. Melton, Fargo; J. S. Gillam, Fargo; James Houghton, alternate, Fargo; W. R. Fox, Rugby; R. M. Fawcett, Devils Lake; Robert Painter, Grand Forks; Bruce Boynton, Grafton; W. C. Dailey, Grand Forks; R. E. Mahowald, alternate, Grand Forks; A. F. Hammargren, Harvey; V. J. Fischer, Minot; G. Christianson, Valley City; Carl Baumgartner, Bismarck; M. S. Jacobson, Elgin; R. W. Henderson, Bismarck; R. B. Tudor, Bismarck; M. E. Nugent, Bismarck; T. E. Pederson, Jamestown; Dean Striden, alternate, Williston; K. G. Foster, Dickinson; R. F. Gilliland, Dickinson; Robert McLean, Hillsboro.

Twenty-five delegates were present and the Speaker declared a quorum.

The following attended the meeting of the House of Delegates:

Drs. D. J. Halliday, W. A. Wright, E. J. Larson, J. C. Fawcett, C. H. Peters, Keith Vandergon, O. A. Sedlak, C. J. Glaspel, O. W. Johnson, W. H. Gilsdorf, R. H. Waldschmidt, and Mr. Lyle A. Limond.

The motion was made, seconded, and passed that the reading of the minutes be dispensed with and that they be accepted as printed in THE JOURNAL-LANCET.

Motion was made, seconded, and passed that the reading of the reports of the president, secretary, executive secretary, and treasurer be dispensed with and that they be referred to the proper Reference Committee.

REPORT OF THE PRESIDENT

My first desire is to bring due attention to the services rendered by our executive secretary, Mr. Lyle A. Limond. He was of help and guidance in conducting the affairs of the association this past year.

Some of the committees have been very active; this is particularly true of the Legislative Committee, Committee on Prepayment Medical Care, and the Committee on Medical Economics.

I wish to commend the Legislative Committee as a whole for the splendid work that they did in securing passage of the Medical Practice Act. We did not succeed in obtaining everything that we wished, but I believe it is a marked improvement over what we had in the past. A further report will be given by the chairman of the Legislative Committee. I wish to commend Dr. O. W. Johnson of Rugby, North Dakota, for appearing before the North Dakota State Legislative Assembly

and doing an outstanding "job" in securing passage of the Medical Practice Act. I wish likewise to commend Dr. L. W. Larson of Bismarck, North Dakota, for appearing against the Osteopathic Bill, which was successfully defeated in the Business and Industry Committee. The other members who gave of their time in appearing before Committees of the Legislature were Drs. Percy L. Owens, Bismarck; C. A. Arneson, Bismarck; C. H. Peters, Bismarck; Paul Johnson, Bismarck; R. O. Goehl, Grand Forks; V. J. Fischer, Minot; W. A. Wright, Williston; Robert Gilliland, Dickinson; G. L. Loeb, San Haven; T. H. Harwood, Grand Forks; R. O. Saxvik, Jamestown; R. P. Froeschle, Hazen; and Charles Porter, Grand Forks. If I have missed any member it was done inadvertently. Other members were active on the home front through personal contacts and letter writing. The Committee on Prepayment Medical Care and the Committee on Medical Economics should be especially commended for the excellent contract they successfully obtained from the Department of Defense. The included fee schedule is far superior to that of many other states. The medical and legal professions should be commended for working cooperatively in an all-out effort to effect passage of the Jenkins Keogh Bill, which would provide tax deferments for the retirement programs of the self-employed.

The North Dakota State Medical Society should give immediate attention to seeing that high quality nursing care be given to the acute and chronically ill patients. Quality nursing care at the present time is on the downgrade. I, therefore, urge that immediate attention to this problem be especially directed to the nursing organizations so that appropriate programs are developed.

It is to be noted that the North Dakota legislators have kept faith with the medical students, due to the fact that a four-year medical course seems impossible at the present time. The Legislature established a loan fund from which students can borrow up to \$5,000 to complete their third and fourth years in an accredited medical college.

If this physician locates in a small community in North Dakota for five years, his obligation of \$5,000, plus interest, will automatically be cancelled. This is a splendid accomplishment as far as the medical student is concerned, because he can obtain a better medical education in the larger centers where much more clinical material is available.

We must continually be alert to the insidious but constantly progressive penetration by federal and state government into the shrinking realm of private medicine. Even though a government program, at its inception, may superficially appear to benefit some segments of the profession and general population, we must realize that another hard won portion of our free enterprise system has been surrendered. Even today, many of our profession find themselves in direct competition with federal and state government medicine, which, due to complete tax subsidization can offer a service "free" or at a very much lower figure than private medicine can afford to do. Thus, the doctor is in a paradoxical situation of paying the bill for the operation of a competing enterprise. The alarming consequences inherent in creeping socialism are evident. The trend must be stopped.

Various members of the North Dakota State Medical Association feel that more economy should be exercised in performing the functions of the North Dakota State Medical Association. Several state societies, however, not touched with the icy finger of chill penury, but anxious to keep up with the times in all matters of taxation, have indicated their intention of increasing the annual levy.

The letter of the secretary of the American Medical Association recently contained a compilation of the various state society dues. The figures indicate a range of from \$20 to \$100 per annum. The North Dakota State Medical Association dues are among the highest. I believe we could safely earmark \$5 or \$10 of our annual state dues to the American Medical Educational Foundation. This is now being done by several other states. I feel it is a privilege and a duty to make an annual contribution in support of the medical schools of this country.

It is my recommendation to the House of Delegates that a Committee on Committees should be appointed for the purpose of studying the feasibility of combining some of the various committees. Many appear to have overlapping functions. This committee would report back to the next meeting of the House of Delegates in 1958.

The most enjoyable experience of my office has been the visits to the district societies. I attended district meetings at Minot, Devils Lake, Grand Forks, Fargo, Jamestown, Bismarck, and Dickinson, and want to thank the various districts for the cordial reception extended to me.

R. H. WALDSCHMIDT, M.D., President

SECRETARY'S REPORT

MEMBERSHIP: The total membership for 1956 was 416. Of this number, 380 paid the regular membership fee, 12 were on a retired or limited basis, and 16 were honorary members. Eight members were carried on a complimentary basis due to military service and age. Eleven members passed away during the year, and several have left the state. New members, however, are being steadily added to our roster.

Table 1 shows the annual membership for the past eight years. You will note that the membership for the years 1955 and 1956 are identical, although up until the year 1955 the membership showed a slow but appreciable gain.

TABLE 1
COMPARISON OF ANNUAL MEMBERSHIP

	1949	1950	1951	1952	1953	1954	1955	1956
Paid memberships	364	356	362	362	368	378	387	380
Honorary memberships	13	12	11	10	12	15	14	16
Retired and limited						12	12	12
Dues cancelled, military service and age exemption			11	12	16	6	3	8
Total	377	368	384	384	396	411	416	416

Table 2 shows the annual dues for 1957, which have been coming in quite slowly. There are still a large number of members who have not as yet paid their 1957 dues, and the District Medical Society secretary and councillors are urged to use every possible means to collect the dues of these delinquent members.

TABLE 2

	April 30 1951	April 15 1952	April 20 1953	April 10 1954	April 8 1955	April 19 1956	May 1 1957
Paid-up members	307	249	296	323	323	334	328
Honorary members	11	8	9	13	14	16	18
To be honorary	2	2	3	4	3	6	2
Dues cancelled, military service		11	12	4	3	5	5
Limited				1	1	1	
Retired				7	7	6	7
Complimentary						1	
Total	320	270	320	352	351	369	360

STATE ASSOCIATION MEMBERSHIPS

1956:	Regular	Retired	Limited	Compl.	Honorary
First	80		1	3	3
Second	26				2
Third	61			1	2
Fourth	58	1		2	3
Fifth	8	1			1
Sixth	59	2	1	1	4
Seventh	31	1			1
Eighth	22				
Ninth	25	4			
Tenth	10	1		1	
Total	380	10	2	8	16

1957:					
First	58			2	3
Second	26				2
Third	55			1	3
Fourth	53				4
Fifth	7				1
Sixth	48	2		1	3
Seventh	30	1			2
Eighth	19				
Ninth	25	3			
Tenth	7	1		1	
Total	328	7		5	18

A.M.A. GENERAL MEMBERSHIPS

	1956	1957
First	81	61
Second	28	28
Third	62	58
Fourth	63	57
Fifth	9	8
Sixth	66	53
Seventh	32	33
Eighth	22	19
Ninth	25	27
Tenth	11	9
Total	399	353

Two of the societies show a paid-up membership roster for the current year, but others have forwarded only partial reports. This is particularly noticeable in the larger districts. The Constitution and By-Laws of the North Dakota State Medical Association state that such dues should be forwarded to the state office not later than March 1 of the current year. It should be noted that, although March 1 is the stipulated date for the receipt of dues, this report is shown as May 1, to give an up-to-date picture of paid memberships.

The secretary has kept in touch with the operations of the state office and wishes to thank Mr. Limond and Mrs. Fremming for their cooperation in these matters of membership.

E. H. BOERTH, M.D., Secretary

EXECUTIVE SECRETARY'S REPORT

MEETINGS: Your executive secretary attended several meetings in behalf of the association and made many personal contacts with individual physicians, newspaper editors, legislators, radio and television station personnel,

hospital administrators, nurses, attorneys, dentists, and others.

I was fortunate in being able to attend at least 1 meeting in 9 of the 10 district medical societies.

It is still felt, as had been stated before, that some of the committees are not too active. Your state office continues to aid in the work of those committees which are active. Your executive secretary was present at all but 2 committee meetings. It is once again suggested that committee meetings be held in the fall or early winter months.

STATE OFFICE: Your headquarters' office is continuing in its efforts to be of even greater service to the total membership, to public and private health agencies, and to the public in general.

The Medicare program and its inherent problems were officially added to the work load of this office on December 7, 1956.

Mrs. G. K. Fremming (Margaret) continues to give fine service as office secretary.

As you all know, it is from here that the membership Newsletter and the auxiliary's Newsletter is processed, the Physicians' Placement Bureau functions, the State Board of Medical Examiners' annual license renewals are handled, Medicare claim forms are processed, committee meetings are arranged and members notified, annual association and A.M.A. dues are handled, disbursement of Uniform Insurance Reporting forms is recorded, the affairs of the eighteen-month-old North Dakota Heart Association are guided, plus many other duties too numerous to continue listing.

LEGISLATION: Your executive secretary came through his third legislative session, since coming to North Dakota, with a few scars but with his head unbowed. I again spent practically twelve to fifteen hours a day with our elected representatives as I did in 1953 and 1955.

It is my sincere belief that thought should be given to having a key physician or two in each county, where possible, as the contact man with members of the legislature.

Your president, Dr. R. H. Waldschmidt, and Drs. O. W. Johnson, R. O. Goehl, W. A. Wright, V. J. Fischer, Charles Porter, Rudolph Froeschle, L. W. Larson, Percy Owens, C. H. Peters, C. A. Arneson, George Loeb, T. H. Harwood, R. O. Saxvik, Robert Gilliland, D. J. Halliday, and Paul Johnson met with some of the legislators plus appearing at committee hearings. Dr. O. W. Johnson, as chairman of the association's Committee on Legislation, did yeoman service and made several trips to Bismarck to appear at committee hearings. Our Committee on Legislation met in Bismarck during the session to study bills and give their advice concerning the association's stand on said bills.

Our greatest struggle was to get senate bill No. 186 passed without too many changes. This bill modernized the statutes pertaining to the practice of medicine. The greatest opposition came from the North Dakota Hospital Association. Senate bill No. 186 passed both houses and was signed into law by Governor John E. Davis on March 15, 1957.

The following is a list of the 12 house bills and the 17 senate bills which we followed rather closely:

Bill No.	Provisions of Bill	Our Action	Outcome of Bill
HB 517	Appropriates \$289,000 for special education of exceptional children	Supported	Passed
HB 533	Provides for new tuberculosis sanatorium at University of North Dakota, releasing present San Haven facility for use by Grafton State School	Followed	Passed
HB 535	Authorizes limited scholarship plan for psychiatrists who agree to serve in state hospital and mental health clinics	Supported	Passed
HB 536	Modernizes state's mental health code	Supported	Passed
HB 599	Provides that records used by State Health Department in studies and investigations be kept confidential	Supported	Passed
HB 600	Provides that users of radioactive materials or radiation machines register with State Health Department	Supported	Passed
HB 646	Amends law regarding handling of drugs, poisons, medicine, and chemicals to include internec pharmacists among those eligible to handle	Followed	Passed
HB 647	Increased pharmacist examination fee from \$15 to \$25	Followed	Passed
HB 668	Amend code relating to the sale of certain drugs, medicines, and chemicals and for other purposes	Followed	Defeated
HB 777	Amend code relating to who may engage in the drug or pharmacy business in this state	Opposed	Defeated
HB 796	Amend code relating to practice of osteopathy. Would give full drug privileges to osteopaths	Opposed	Defeated
HB 817	Amend code so that State Hospital could be licensed by State Health Department	Supported	Passed
SB 5	Appropriates \$437,500 to State Health Department	Supported	Passed
SB 32	Appropriates \$26,000 for state nursing scholarships	Followed	Passed
SB 42	Provides Health Department and Dairy Division of Agriculture and Labor Department to work jointly in inspection of dairy products	Followed	Passed
SB 53	Eliminates citizenship requirement for dentists	Followed	Passed
SB 59	Amends laws covering chiropody	Followed	Passed
SB 64	Appropriates \$35,000 for State Commission on Alcoholism	Followed	Passed
SB 92	Allows chiropractors to sign accident and sickness insurance claims	Opposed	Defeated
SB 181	Creates medical center loan fund for medical students who agree to practice medicine in North Dakota	Supported	Passed
SB 186	Modernization of the laws governing the practice of medicine	Supported	Passed
SB 187	Dealt with the coroner system	Followed	Withdrawn
SB 188	Dealt with licensing of masseurs	Token opposition	Defeated
SB 202	Scholarships for chiropractors	Followed	Defeated
SB 224	Prohibiting advertising of eye glasses or other optical appliances	Followed, token support	Passed
SB 225	Stiffens requirements for admittance to practice of optometry	Followed, token support	Passed
SB 234	Licensing of sales representatives of Blue Cross and Blue Shield	Followed	Passed
SB 261	Governing production, processing, labeling, and sale of milk, cream, and liquid milk products	Followed with token opposition	Defeated
SB 295	Permits chiropractor to use the title "doctor"	Token opposition	Passed

On the national scene, we find the usual terrific number of bills in the health field. It appears that each major political party wants to outdo each other with the cradle to the grave philosophy in the fields of health, education, and welfare. Representative Dingle is following in his late father's footsteps with a bill providing free medical care to all.

The new Jenkins-Keogh bills, HR 9 and 10, are back and should be supported by the self-employed if they are interested in setting up retirement plans by deducting from *gross income* their annual contributions to such plans. Our House of Delegates may wish to go on record in supporting the Jenkins-Keogh bills, HR 9 and 10.

PHYSICIAN'S PLACEMENT SERVICE: Eighteen North Dakota communities and 10 physicians or groups are on file in this office in regard to requests for a physician and/or additional physicians.

Several avenues of publicity are still being used in alerting the public that the North Dakota State Medical Association is offering this placement service. I feel certain that we will be called on to furnish this information to the Medical Center Loan Fund Committee for their work in giving loans to medical students who promise to settle in North Dakota communities under 3,000 population.

The 18 communities seeking a physician or an additional physician are as follows: Anamoose, Belfield, Bowman, Buffalo, Finley, Flasher, Fordville, Grenora, Killdeer, McHenry, Milnor, Mohall, Napoleon, Page,

Pembina, Richardton, Strasburg, and Wishek. The 4 towns of those listed above having a physician but wanting 1 or more are: Bowman, Napoleon, Richardton, and Wishek.

This office, as of April 1, 1957, has received word that 5 physicians have moved to North Dakota because of the efforts and publicity emanating from the Physicians' Placement Service.

U.N.D. MEDICAL SCHOOL SCHOLARSHIPS: The 1956 winners of our scholarships (totaling \$500), offered at the School of Medicine were as follows: anatomy, Donald J. Feist and Alvin L. Larson (equal); physiology and pharmacology, Wolfgang W. Oppelt; bacteriology and parasitology, Stanley D. Thompson; pathology, John R. Henneford and Wolfgang W. Oppelt (equal); and first year, James B. Hoyme.

FINANCE: The treasurer's report shows a definitely improved balance. The goal of having one year's operating budget in reserve has been reached. This reserve fund should be maintained in the interests of good business practice.

Receipt of dues was the slowest in many years when you note the following chart and realize that we are reporting these figures as of May 2, 1957—the latest reporting date in many years. Stutsman County and Sheyenne Valley District Medical Societies were paid up 100 per cent *on or before* May 2, 1957. The status of the remaining district societies regarding payment of dues as of May 2 was as follows:

<i>District</i>	<i>Number of unpaid members</i>
First	25
Second (Devils Lake)	2
Third (Grand Forks)	6
Fourth (Northwest)	4
Sixth	17
Eighth (Kotana)	1
Ninth (Southwestern)	2
Tenth (Traill-Steele)	1

Section 2 of chapter 9 of the By-Laws reads as follows: "Any district society which fails to pay its assessment or make the report required, on or before the first day of April in each year, shall be held as suspended, and none of its members or delegates shall be permitted to participate in any of the business or proceedings of the society or of the House of Delegates until such requirements have been met."

If this section were adhered to, we would have no annual session.

MEDICAIRE: As you all should know by now, the Dependents' Medical Care Program (Medicare) commenced on December 7, 1956. Up to April 16, 1957, 145 claims had been processed by this office. The first claim was dated December 13, 1956 and was for an upper respiratory infection.

Seventy-four doctors of medicine have given care to patients covered under this program as of April 16.

The total sum paid to North Dakota physicians through April 16 amounts to \$6,646.10. The smallest check was for \$5. The largest check was for \$250.

Each claim for services rendered averages roughly \$45.83 per claim.

Claim forms are still coming to this office which are filled out in an incorrect manner. It is my feeling that too many of our members have neglected to read the informational booklet on Medicare sent them in December 1956.

ANNUAL SESSION: Your executive secretary wishes to thank Dr. O. A. Sedlak, general chairman, the chairmen, and members of the several committees, plus the other members of the First District Medical Society with whom he has worked in connection with the 1957 annual meeting.

My thanks also go to Dr. W. E. G. Lancaster, chairman of the Scientific Program Committee and the members of said committee for arranging a splendid scientific program.

It is hoped that our annual meeting this year will be free of deficit.

THOUGHTS FOR THE FUTURE:

1. The formation of a Committee on Committees to see if our association has too many of them and how to get better results from the committees we have or may have.

2. Holding a fall meeting for officers of District Medical Societies for the purpose of indoctrinating them in their duties. I sincerely believe that the office of secretary-treasurer of a local society is the most important and time-consuming of all. Reports and the collection of dues are too long overdue in many instances. This office has received many letters and long distance phone calls regarding nonreceipt of membership cards for the A.M.A. and N.D.S.M.A. This is embarrassing to the physicians who pay promptly.

3. *Medical Milestones in North Dakota* should be corrected and sent to the printer this year.

4. Continued support should be given the State Health Department. The House of Delegates may wish to pass

a resolution supporting the interim appointment by the governor in filling the vacancy caused by Mr. Jerome Svore's resignation to accept a United States Public Health assignment out-of-state. This interim appointment will continue until a physician is appointed by Governor Davis to the office of state health officer.

5. Consideration should be given to Dr. O. W. Johnson's request that the House of Delegates urge the district medical societies to consider becoming sponsors in the National Essay Contest of the Association of American Physicians and Surgeons.

6. Consideration should be given to the possibility of drawing up an "Agreement of Understanding" between the North Dakota State Medical Association and the North Dakota Hospital Association.

ACKNOWLEDGMENTS: Your executive secretary wishes to express his sincere appreciation to our president, Dr. R. H. Waldschmidt, and those other splendid gentlemen for their efforts in behalf of this association. Once again this writer gives his heartfelt thanks to all with whom he has had occasion to work during this past year in the association's program of public enlightenment to the great problems of medicine and of its efforts to bring ever-improving medical services to the people of North Dakota.

LYLE A. LIMOND, Executive Secretary

Speaker Dodds next took up a matter of unfinished business; namely, the revision of the Constitution of the State Medical Association. This revision was published in *THE JOURNAL-LANCET* in October 1956. This was approved in its entirety by the House of Delegates meeting in Aberdeen in 1956. The Constitution of the association requires that for the ultimate approval of the changes in the Constitution, they must be approved at one meeting of the House of Delegates, then tabled, and the next year have the final approval of the House. Speaker Dodds stated that if there was no disagreement of the approval of the Constitution that the chair would entertain a motion at this time for adoption of the Constitution as approved at the meeting in Aberdeen. Dr. T. E. Pederson moved that the changes in the Constitution as printed in *THE JOURNAL-LANCET* in October 1956 be adopted. The motion was seconded by Dr. Wold. Dr. Tudor commented that there is a suggested revision of the Constitution in the Handbook which states that the councillors shall be elected to serve for a term of three years—the limit of consecutive terms shall be two. He inquired if the above motion approved this revision at this time. Dr. Boerth, secretary, responded that the revision will be taken up by the proper Reference Committee and brought before the second annual session. In this connection, at the council meeting earlier on this same day, it was noted that one of the councillors has been consistently absent. If a councillor does not attend meetings of the council without ample excuse, the council shall elect someone else as councillor from that district. The council has its annual meeting in May and its interim meeting in December. If a man is not present to report for his district, that district is without representation. The Committee on Constitution and By-Laws wishes to add a sentence to cover this, and it will be given to the Reference Committee for study of this proposal.

Speaker Dodds stated that this is from the Committee on Constitution and By-Laws and did not appear in the Handbook. The matter was discussed by the council earlier in the day and needs action at this time. The action on this, together with the action in the Handbook, will have to be voted on the next day at the sec-

ond session and, in turn, lie over for one year. The motion was then voted on and passed and the changes in the Constitution approved at the 1956 meeting of the House of Delegates were adopted.

Speaker Dodds next presented to the members of the House of Delegates, Mrs. Charles Arneson, president of the Woman's Auxiliary of the North Dakota State Medical Association, who presented her annual report.

REPORT OF THE PRESIDENT OF THE WOMAN'S AUXILIARY

Doctor Dodds, speaker of the House, members of the House, and guests: It is a pleasure for me, as president of the North Dakota Women's Medical Auxiliary, to present, somewhat briefly, this annual report of your medical auxiliary. You know our national Auxiliary headquarters in Chicago looks with great favor upon this presentation to the House of Delegates. Because of this, I hope you will continue to reserve a permanent place in you busy convention meeting, just for this report.

Before I came to this meeting, I asked my husband which doctors' wives he would include in a list of outstanding medical auxiliary members in North Dakota. He thought a while and said, "Well, Gladdie, I think that my list would include one less name than you think."

Our women of the auxiliary very much enjoy the close cooperation and congenial relations that now exist with the State Medical Association. As just one example, we very much appreciated the fine remarks and greetings of your president in our anniversary issue of our state Newsletter. To those of you who may not have seen this, I'm going to pass this around.

Tonight, the first ten years of medical auxiliary activities in North Dakota will be completed, for it was on May 26, 1947, right here in Fargo, that our auxiliary was founded. With this tenth anniversary, it is revealed that the physicians' wives of North Dakota have carried out most all the national auxiliary objectives and have made an enviable record, with accomplishments comparable to any state. It is with considerable pride that we now look back at these ten memorable years of our auxiliary in North Dakota.

From the 163 charter members at the time of our organization, we have grown to 300 members. This represents almost 86 per cent of our total potential membership. During these ten years of auxiliary in North Dakota, our entire state has remained organized into 10 districts, which correspond to your 10 medical districts. This fact, too, has received favorable national recognition.

Our programs, activities, and projects are too numerous to mention in great detail. Our Sophomore Medical Student Loan Fund, which began in 1951, still remains our outstanding project. This year we raised almost \$2,400, making a grand total in this fund of more than \$12,000. We realize that much of the glamour of this project has been taken away with the passage of Senate bill 181, providing a Medical Center Loan Fund. Nevertheless, Dean Harwood has informed us that this fund still will be most useful and has suggested other possibilities for the utilization of this money. Already scheduled for our business meetings the next few days will be a discussion on this project with possible revisions or the undertaking of some similar new major project.

We have been particularly proud of our mimeographed Newsletter, which is sent out to all physicians' wives regardless of their membership in the auxiliary. Our crowning achievement in this line has been our tenth anniversary issue, which was our first printed edition and, incidentally, has now been completely paid for. There

have been many quotes from our Newsletters in other state papers with several in the New York State Auxiliary publication.

In legislation, we tried to be of some assistance with many of the state bills that presented problems. Right now we are trying to help with favorable federal legislation.

Every district auxiliary has reported participation in different acts of public and community service. In fact, name any worthwhile project, and several medical auxiliary members will be found among the volunteer workers. This role on the part of the North Dakota doctors' wives has created good public relations.

Our contributions to the American Medical Education Foundation are now in the third year. Although our total for A.M.E.F. this year is only \$323, this is more than seven times our first years' contribution, indicating that our effectiveness and influence should grow.

Nurse recruitment, one of our active projects, has been changed to recruitment including all the fields allied to medicine. With this change, recruitment by our auxiliary has taken on a new look in North Dakota with even more enthusiasm and activity. Interest in mental health has continued. In 5 of our districts with civil defense programs, an average of 40 per cent of the auxiliary members participate in some category of the work. One of our members has been appointed assistant civil defense administrator. Our newest project, which was not undertaken until January of this year, is safety. It is believed that safety will occupy a prominent place next year.

As state president I attended the National Auxiliary Convention in June, where I gave our state report and also was a member of the public relations panel. I also attended the Fall Conference for Presidents and President-Elects and introduced the subject of rehabilitation to the national auxiliary as a member of the program panel. With the approval of our national secretary that it would be good for public relations, this short paper appeared in President Eisenhower's national magazine for the handicapped, *Performance*. I brought along a couple copies which I will pass around. You know, no one so far has asked me for an autographed copy.

I have personally visited 9 of the 10 district auxiliaries, and at 7 of these I talked on the auxiliary in North Dakota, giving special attention to legislation, rehabilitation, and public relations. In all my visits, I have been impressed with the wonderful hospitality and the congeniality of the district societies and with the importance and beneficial results of all their varied activities and projects. I know this has done much to bring our women closer together in a spirit of harmony and good will.

In reviewing the auxiliary's accomplishments, it is realized that only through the coordinated effort and interest of all our women, together with your help and support, has progress been made. With the first ten years now in the past, the North Dakota Women's Medical Auxiliary, with your continued backing and encouragement, may look forward to the second decade with an even greater promise of achievements. Thank you.

The Chair next entertained a motion to dispense with the reading of all the reports printed in the Handbook and to refer them to the proper reference committees for their consideration. The motion was made, seconded, and passed.

REPORT OF THE CHAIRMAN OF THE COUNCIL

The Council of the North Dakota State Medical Association had their regular scheduled meetings June 1 and

June 2 at the Alonzo Ward Hotel at Aberdeen, South Dakota. Special meetings of this council were held on August 18, 1956, and October 13, 1956, at the Prince Hotel, Bismarck. A meeting of the Executive Committee of the Council was held at the Prince Hotel, November 20, 1956, and a regular interim meeting was held December 8, 1956, at the Gardner Hotel, Fargo. This totaled 5 sessions for the council, plus 1 meeting of the executive committee of the council.

Council meeting—Saturday, June 1, 1956, at Aberdeen, South Dakota. It was moved and passed that the auditing committee of the treasurer's report be dispensed with in that the funds of the North Dakota State Medical Association are now being audited by a certified public accountant.

Copies of the newly published *Medical Milestones in North Dakota* were examined by the council. Due to the many errors found in the book, it was decided that these be corrected before releasing the book to the members and public. Action for correction of these errors was taken during the meeting of the council by telephone contact with the publishers.

A motion was made and passed that THE JOURNAL-LANCET be the official publication of the association for the year of 1956-1957.

Council meeting—June 2, 1956, at Aberdeen, South Dakota. Dr. J. C. Fawcett resigned from the council because of his election to the office of the second vice-president. The election of officers ensued and the following were elected: A. R. Gilsdorf, M.D., chairman; R. D. Nierling, M.D., vice-chairman; and W. H. Gilsdorf, M.D., secretary.

The executive committee of the council was appointed and consisted of the above three councilmen.

It was emphasized that the councillors contact the doctors in their own district who care for the legislators personally and send such doctors' names to the executive secretary for his use during the legislative session.

The regular interim meeting of the council was set for December 8, 1956, at the Gardner Hotel, Fargo, North Dakota.

Special meeting—August 18, 1956, at Bismarck, North Dakota. This special meeting was called for discussion of Public Law 569 and the part to be played by the North Dakota State Medical Association under the provisions of such law. After the discussion of Public Law 569, it was moved and passed that the North Dakota State Medical Association accept the responsibility of carrying out the provisions of said law providing an acceptable contract can be negotiated. The North Dakota Committee on Prepayment Medical Care was to meet in Bismarck on September 15, 1956, to prepare a fee schedule as stipulated in Public Law 569. This would then be reviewed by the council at a later date.

Dr. R. H. Waldschmidt, president of the North Dakota State Medical Association, discussed the formation of a Committee on Inter-Professional Relations and asked for approval to form such a committee. Dr. Vandergon moved acceptance of the proposal to form a Committee on Inter-Professional Relations with the addition of ethically licensed chiropodists and optometrists. Dr. Peters seconded. Motion passed.

It was moved and passed that the North Dakota State Medical Association be incorporated as a nonprofit corporation.

Special council meeting—October 13, 1956, Bismarck, North Dakota. The main purpose of this meeting was to discuss Public Law 569. The schedule of allowances for services under Public Law 569, as drawn up and

studied by the Committee on Medical Economics and Committee on Prepayment Medical Care was submitted for formal approval. Since the council at its August 18, 1956, meeting had voted to cooperate with the Department of Defense in providing a fee schedule for the medical community of North Dakota, it was moved and seconded to accept the schedule as presented and to formally approve same on behalf of the North Dakota State Medical Association.

Contributions to the American Medical Education Foundation were discussed. It was the general consensus of those present that the contributions should remain on a voluntary basis. No formal action was taken.

A motion was approved to send each member of the state legislature three copies of *Today's Health*.

A meeting of the executive committee of the council—November 20, 1956, Bismarck, North Dakota. The purpose of this meeting was to finalize the contract with the Department of the Army in accordance with Public Law 569. Dr. R. H. Waldschmidt, president of the North Dakota State Medical Association, signed the above-mentioned contract for the association. Another order of this meeting was the signing of papers of the incorporation of the North Dakota State Medical Association as a nonprofit organization.

Dr. C. H. Peters and Mr. Lyle A. Limond were commended for their efforts on behalf of the association in regard to negotiating the above contract.

The regular interim meeting of the council—December 8, 1956, Fargo, North Dakota. Dr. M. E. Nugent spoke on problems concerning ophthalmologists and optometrists. He stated that there have been reports of difficulty in some instances, for people to obtain repairs for their spectacles. He presented formal resolutions to the council for the correction of these difficulties plus the resolution that the secretary of the State Medical Association send a copy of these resolutions to each dispensing optical house within North Dakota and to the director of the Legislative Research Committee. These resolutions were accepted by the council.

President R. H. Waldschmidt, M.D., was empowered to appoint a Medicare Screening Committee whose duties would be to review any claims appearing to be improper.

A letter from Paul I. Robinson, major general, M.C., Office of Dependents' Medical Care, to Mr. Lyle A. Limond, executive secretary of the state medical association, was read. In general, the most important portion of General Robinson's letter is the following paragraph: "In reviewing your schedule, we feel that it is somewhat high, generally speaking. In our opinion, if the amounts specified in the schedule are routinely paid, the medical economy within your state may well be disturbed. Therefore, it has been considered appropriate that this letter be written to encourage careful surveillance during the first months to assure that this maximum fee is not paid for procedures which do not ordinarily demand such remuneration." Our executive secretary was directed to answer General Robinson's letter, but the council did not believe any special action was indicated.

A motion was carried to charge \$5.00 per person for the Sunday night mixer at the annual meeting of our association. This action was taken in defense of those who did not wish to attend the mixers.

Dr. Cyrus H. Maxwell, assistant director and Mr. George E. Connery, editor of the A.M.A. *Washington Letter*, were present for this meeting. Our guests discussed the enormous increase in expenditures of public funds in the entire field of medicine and welfare and stated that we may expect continual increase in such expenditure.

The council approved the recommendation from the Committee on School Health which reads as follows:

"The Committee on School Health of the North Dakota State Medical Association recommends (pending approval by the council of the North Dakota State Medical Association) to the Division of Special Education, that serious thought be given to ways and means of extending its present program of activities for aiding the educable mentally retarded children and behavior problem children through special classrooms in each county and/or with the classrooms possibly associated with our teacher training institutions. It is further recommended that such a program commence with the first grades in our public schools."

Dr. R. H. Waldschmidt, president of the North Dakota State Medical Association, commented on the following topics and discussion followed: (1) American Medical Education Foundation, (2) status of Blue Shield, (3) duties of councillors, (4) state health council actions, (5) legislation to be sponsored or supported by the North Dakota State Medical Association, (6) safety program or cooperation in the field of safety, and (7) complimented the Committee on Prepayment Medical Care and Medical Economics and the council on their work on the Medicare Program.

A. R. GILSDORF, M.D.,
Chairman of the Council

REPORTS OF COUNCILLORS

First District

The First District Medical Society held 9 meetings in 1956. The following men held office during the year: president, Dr. George Foster; vice president, Dr. Ralph Weible; secretary-treasurer, Dr. A. L. Klein. At the January Meeting, Dr. John Briggs, associate professor of medicine at the University of Minnesota, spoke on "Curable Forms of Heart Disease."

At the February meeting, Dr. T. H. Harwood, dean of the Medical School at Grand Forks spoke to us on "Changing Patterns in Medical Care."

At the March meeting, Dr. Robert Kierland, dermatologist at the Mayo Clinic, spoke on "Cutaneous Manifestations of Internal Diseases."

The scientific portion of the meeting in April was conducted through the auspices of the North Dakota State Cancer Society. The speakers were Dr. James R. Arey and Dr. George B. Pilling of St. Christopher's Hospital for Children in Philadelphia. The subject was "Malignant Tumors of Childhood."

During the September meeting, the Dakota Clinic announced their intention of establishing an annual lectureship in honor of two of its founders—Dr. Kent Darrow and Dr. William Long. Dr. Alvin Schultz, clinical assistant professor of medicine at the University of Minnesota, presented an interesting discussion on laboratory tests in the diagnosis of thyroid disease.

At the October meeting, Mr. Lewis Oehlert, an attorney in Fargo, addressed the society on "Personal Observations of Malpractice Cases."

At the November meeting, the nominating committee presented a slate of nominees for officers for the year 1957 and these were elected unanimously. They are: president, Dr. R. D. Weible; vice-president, Dr. L. G. Pray; secretary-treasurer, Dr. A. L. Klein. The speaker for the November meeting was Dr. Martin Fitzgerald, associate professor of medicine at the University of Kansas. He presented a talk on "Tuberculosis and Other Pulmonary Problems of An Aging Population."

During 1956, this society lost two of its members by death—Dr. Frank Darrow and Dr. Harry Fortin.

V. G. BORLAND, M.D., Councillor

Second District

The Devils Lake District Medical Society held 9 regular scheduled meetings during the year of 1956, and 1 extra meeting, at which time the Cancer Caravan furnished the program. The turnout for the meetings was very good at practically every meeting. Some of the younger men in the district who had not joined our state society have been induced to do so, though their attendance at meetings has not been too good. Needless to say, there are many lengthy discussions with reference to the economic aspects of medicine, most dealing with Medicare and especially the recent changes in the Crippled Children's Program.

Regarding Blue Shield, our representative, Dr. Louis F. Pine, attended all of the meetings, and has been very active and very efficient in keeping us up-to-date in developments. We have been fortunate in having outside speakers from various centers furnish papers for the scientific meetings.

Officers elected for the year of 1957 are: president, Dr. L. T. Longmire, Devils Lake; vice-president, Dr. G. H. Hiltz, Cando; and secretary-treasurer, Dr. Louis E. Pine, Devils Lake. Delegates are: Dr. William Fox, Rugby; and Dr. R. M. Fawcett, Devils Lake. Alternates are: Dr. J. H. Mahoney, Devils Lake; and Dr. D. W. Palmer, Cando. Censor is: Dr. G. N. Vigeland, Rugby.

G. W. TOOMEY, M.D., Councillor

Third District

As councillor for the Third District of the state association, it gives me a great deal of pleasure to report that for 1956, this district has held many interesting scientific meetings. The membership has continued about the same as in the past.

The president of the society for 1956 was Dr. A. E. Culmer of Grand Forks, and the secretary was Dr. James Leigh. The president elected for 1957 is Dr. Charles Graham. The secretary and treasurer remain the same.

N. A. YOUNGS, M.D., Councillor

Fourth District

Because of the unfortunate accident and resulting illness that completely disabled Dr. A. D. McCannel, councillor from the Fourth District, I have the honor to submit the report of the activities of the Fourth District Medical Society.

During the year, 7 regular meetings were held. In addition, 1 special meeting was held August 25 to hear a report on the newer hypoglycemic agents. This report was presented through the courtesy of the Veterans Administration Hospital.

A list of the regular meetings and programs is as follows:

January 26—election of officers.

February 23—film on Hodgkin's disease, lymphomas, and leukemia.

March 22—"Convulsive Disorders," by Dr. Frank Morrell, University of Minnesota.

April 25—Cancer Caravan, "Malignancy in Children" by Drs. Boggs and Riker.

September 27—"Rehabilitation of the Chronically Ill Patient" by Dr. Frank Krusen, Mayo Clinic.

October 18—"Pathology of Diabetes" by Dr. E. T. Bell, University of Minnesota.

November 7—"Treatment of Tuberculosis Among the Older Age Groups" by Dr. T. J. Kinsella of Minneapolis. Sponsored by the North Dakota Tuberculosis and Health Association.

Seven new member were taken into the society: Raymond A. Vaaler, M.D., Minot; Gilbert Fish, M.D., Garrison; John D. Condie, M.D., Mohall; Richard M. Steidl,

M.D., Mohall; J. R. McDougall, M.D., Minot; and D. L. Kohl, M.D., Minot.

The following members left the jurisdiction of the society: M. P. Conroy, M.D., F. F. Veenbaas, M.D., B. Sotoodeh, M.D., and Gilbert Fish, M.D.

The following members died during the year: W. E. Blatherwick, M.D., New Town; J. A. Johnson, M.D., Bottineau; K. O. Knudson, M.D., Minot; and H. L. Halverson, M.D., Minot.

The society has a total membership of 64, of whom 57 are active, 6 retired or honorary, and 1 is in the military service.

In June, Drs. A. D. McCannel and A. R. Sorenson were presented with gold pins and honorary certificates signifying fifty years of continuous practice in the state.

Officers elected for 1957 are: president, Dr. John Ayash; vice-president, Dr. W. B. Huntley; and secretary-treasurer, Dr. J. S. McArdle. Delegates are: Dr. A. R. Sorenson, Dr. F. D. Naegeli, Dr. A. F. Hammargren, Dr. Fred Erenfeld, and Dr. V. J. Fischer. Alternates are: Dr. Oliver Uthus, Dr. B. Z. Jordinsky, Dr. Samuel Shea, Dr. W. B. Huntley, and Dr. J. L. Devine.

D. J. HALLIDAY, M.D., Councillor at large

Fifth District

The Fifth District Medical Society held 8 meetings in 1956.

In January, the election of officers was held. Dr. B. C. Corbus spoke on urological problems.

In March, and later on in the year, 2 of the Upjohn's Grand Rounds films were shown.

In May, the members went to Fargo and to Jamestown for the Cancer Caravan.

In June, Dr. Merrifield gave a seminar on Psychometrics.

Dr. John Goff discussed the eye in August.

In October, Dr. Frank Melton discussed the Common Disorders of the Skin.

Two members, Drs. Fennell and Wicks, transferred.

December noted the passing of past president F. L. Wicks, a member who was active to the time of his death.

W. H. GILSDORF, M.D., Councillor

Sixth District

The Sixth District Medical Society usually meets in Bismarck. The average attendance during the year 1956 was 40. Four meetings were held. Membership at the end of 1956 was 66.

Officers for 1957 are: president, Dr. P. L. Blumenthal, Mandan; vice-president, Dr. Herman Bertheau, Linton; and secretary-treasurer, Dr. R. D. Schoregge, Bismarck. Delegates are: Dr. Milton Nugent, Bismarck; Dr. C. J. Baumgartner, Bismarck; Dr. M. S. Jacobson, Elgin; Dr. R. W. Henderson, Bismarck; and Dr. Robert Tudor, Bismarck. Board of Censors are: Dr. G. R. Lipp, Dr. E. D. Perrin, and Dr. P. L. Owens, all of Bismarck.

The speakers and their topics at the meetings were: April 10, Dr. Amos Gilsdorf, Dickinson, "Differential Diagnosis of Gallbladder Disease." May 2, Drs. Arey and Pilting of St. Christopher's Hospital for Children in Philadelphia, sponsored by the North Dakota State Cancer Society, "Malignant Tumors in Children." November 19, Dr. M. J. Fitzpatrick of the University of Kansas, sponsored by the North Dakota Tuberculosis Association, "Pulmonary Disease in an Aging Population." December 19, Dr. Kent Olson of Minneapolis, "Neurosurgical Aspects of General Practice."

Members who joined the Sixth District Medical Society in 1956 are: Dr. B. A. Girard, Beulah; Dr. P. A. Walter, Hazen; Dr. Marwin Lommen, Mandan; Dr. R.

P. Froeschle, Hazen; Dr. Joseph Cleary, Bismarck; and Dr. C. R. Montz, Bismarck.

The society regrets to report the passing of one of its old members, Dr. Victor LaRose of Bismarck.

The Sixth District Medical Society, on motion passed at the regular meeting on November 19, 1956, requested the Prepayment Medical Committee of the state medical association to work out a fee schedule on a unit plan basis for North Dakota, which might serve as a basis for any future negotiations on fee schedules, re governmental or private agencies. At the regular meeting on December 19, 1956, Dr. Robert Radl of the Sixth District Medical Society, and a preceding councillor for this district, received the unanimous thanks of this component society for his excellent service in the past. This society appears to have enjoyed a successful year.

C. H. PETERS, M.D., Councillor

Seventh District

Since the last report in 1956 the Seventh District has held 5 meetings.

On Tuesday, May 1, 1956, the annual Cancer Caravan came to Jamestown. Dr. George Pilling, pediatric surgeon, and Dr. James Arey, pathologist of St. Christopher's Children's Hospital in Philadelphia, were the guest speakers. They discussed "Neoplasms in Childhood"—Dr. Pilling from the standpoint of the surgeon's approach and Dr. Arey from the standpoint of the pathologist. The Society donated \$100 to the high school science fair.

On Thursday, October 25, 1956, the meeting was held at the Jamestown Hospital. Discussion of Section 8 of the Code of Ethics of the A.M.A. was taken up. Guest speakers for the evening were Dr. D. O. Ferris and Dr. John Ivins of the Mayo Clinic. Dr. Ivins spoke on "Intermittent Claudication." He feels that medical, drug or mechanical therapy are of little permanent value in the treatment. Dr. Ferris spoke on "Hypersplenism and Indications for Removal of the Spleen." He discussed the functions of the spleen and stated that splenectomy is curative in primary hemolytic anemia and pure thrombocytopenic purpura.

On November 28, 1956, the third meeting was held at the Jamestown Hospital. Dr. Nierling reported upon the recent meeting of the executive committee of the council in Bismarck and the signing of a contract with the government to care for the dependents of military personnel. He also reported on prospective legislative bills concerning the medical profession to be introduced at the coming legislative session in January. The guest speaker for the evening was Dr. Martin Fitzpatrick, associate professor of medicine at the University of Kansas and chief of the Pulmonary Section of the Medical Center. His topic for the evening was "Treatment of Tuberculosis and Other Diseases of our Aging Population." He discussed the history of tuberculosis, the declining morbidity and mortality, the treatment with chemotherapy and surgery, with the abandoning of pneumothorax and pneumoperitoneum. He also discussed other chronic infectious diseases, neoplasms, and the common chronic pulmonary emphysema of the aged. Dr. Fitzpatrick came to us under the sponsorship of the North Dakota Tuberculosis and Health Association.

The first meeting in 1957 was held January 31, 1957, at the Jamestown Hospital. Mr. Lyle Limond discussed the legislative bills coming up before the legislature and stated that the Medical Practices Act is to be introduced for revision and amendment. The following officers were elected for 1957: president, James V. Miles, Jamestown; vice-president, Neville Turner, LaMoure; and secretary-treasurer, R. D. Nierling, Jamestown. Delegates are:

T. E. Pederson, Jamestown; and J. Van der Linde, Jamestown. Alternates are: R. O. Saxvik, Jamestown; and J. N. Elsworth, Jamestown. Censors are: three years, J. Van der Linde, Jamestown; two years, Ellis Oster, Ellendale; and one year, Robert L. McFadden, Jamestown.

Dr. O. A. Sedlak and Don Eagles of Blue Shield both spoke upon problems associated with this organization. Dr. Sedlak pleaded for more information and legibility on the claim sheets. Mr. Eagles stated that there are over 124,000 contracts in operation in the state and that a uniform national contract is anticipated within the next few years.

On Thursday, February 28, 1957, the meeting was held at the Jamestown Hospital. President Miles appointed Dr. Robert E. Lucy as chairman, with Drs. Thomas E. Pederson and John Van der Linde as a poliomyelitis committee to sponsor a poliomyelitis campaign for inoculations of the public. Dr. Charles Arneson of Bismarck, whose wife was a guest of the auxiliary that night, spoke to the society on the legislative session in Bismarck and the experiences incurred with the passage of the Medical Practices Act. A one-hour film, an original telecast, sponsored by the Upjohn Company, concluded the program. The title of the film was "Acute Abdominal Problems." The film consisted of diagnostic problems involved in the treatment of 3 cases of abdominal emergencies and the comments offered by the distinguished members of the panel. Members of the panel were Drs. Owen Wangenstein, Leo Rigler, and Walter Palmer.

The last meeting this spring will be May 1, at which time the Cancer Caravan will again visit Jamestown. The program will be "Care of the Elderly Cancer Patients."

R. D. NIERLING, M.D., Councillor

Eighth District

The Eighth District Medical Society is comprised of physicians practicing in Watford City, Tioga, Crosby, and Williston. Currently we have 19 members.

Since the last state meeting, we have had 7 meetings, 2 of which were scientific sessions with eminent speakers. These meetings were well attended as were the other meetings of the year.

The Eighth District annual business meeting was held on February 7, 1957, at the Good Samaritan Hospital. The following officers were elected for the ensuing year: president, G. E. Ellis, M.D., Williston; vice-president, J. J. Korwin, M.D., Williston; and secretary-treasurer, H. Charles Walker, Jr., M.D., Williston. Delegate is: A. K. Johnson, M.D., Williston. Alternate is: D. R. Strinden, M.D., Williston.

JOSEPH D. CRAVEN, M.D., Councillor

Ninth District

The Ninth District Medical Society held 6 official medical meetings in 1956. Four of these meetings were in Dickinson; 1 was held at Bowman, North Dakota, and 1 in Mott, North Dakota.

The first meeting was at Bowman on January 21, 1956. We were guests of the Tri-State Clinic and Tri-State Hospital. This was a dinner meeting. Our guest speaker was Dr. Jane Hare of Rapid City, South Dakota, who gave a paper on "Eczema of the Hands."

The second meeting was on May 3, 1956, and was incorporated as part of the program of the Cancer Caravan. Drs. James R. Arey and George Pilling of St. Christopher's Hospital for Children, Philadelphia, were our guest speakers. A business meeting was also accomplished at this time.

The third regular meeting was on June 16, 1956, at Mott. This was essentially a business and social meeting. The society considered the recommendation of the Committee on Rural Health to set up immunization booths at the fairs during 1956. We did not favor this recommendation because it would be an inadequately controlled type of medical service with possible adverse effects.

The fourth meeting was on September 15, 1956. A movie on "Office Management of the Allergic Child" was shown and this was followed by discussion. A motion was made and seconded to make the contributions to the American Medical Education Foundation compulsory rather than voluntary. There followed heated discussion and the motion was carried by a small majority. Because of the strong feelings on both sides of this motion, our delegates were instructed to bring this discussion before the House of Delegates at the next annual meeting. There was, however, unanimous opinion that substantial contributions should be given to the American Medical Education Foundation.

The fifth regular meeting was on November 29, 1956. There was a short business meeting followed by a scientific paper given by Dr. Martin J. Fitzpatrick of Kansas City entitled, "Tuberculosis and Other Pulmonary Problems of an Aging Population."

The sixth and last meeting was on December 14, 1956. This was essentially a business meeting for election of officers. At this time, this district had 25 active doctors and 5 retired doctors. All medical dues have been paid.

The following officers were elected for the year 1957: president, James J. Moses, M.D.; vice-president, H. C. Larsen, M.D.; and secretary-treasurer, D. J. Reichert, M.D. Delegates are: R. F. Gilliland, M.D., and K. G. Foster, M.D. Alternates are: A. A. Curiskis, M.D., and J. E. Tosky, M.D. Councillors are: W. C. Hanewald, M.D., R. E. Hankins, M.D., and R. F. Raasch, M.D.

President James Moses appointed the following members to represent us in the North Dakota Physicians Service Corporation: A. R. Gilsdorf, M.D., R. W. Rodgers, M.D., R. F. Gilliland, M.D.; and K. G. Foster, M.D.

A. R. GILSDORF, M.D., Councillor

Tenth District

As councillor for the smallest district, I am sorry to say our members decreased. In February, 1957, Dr. Syver Vinje passed away after fifty-odd years in practice.

No new members were enrolled in the past year.

The society held 5 official meetings, all of which were dinner meetings followed by business and scientific sessions.

Officers for the coming year are: president, Dr. Marvin Rosenberg; vice-president, Dr. R. C. Little; and secretary-treasurer, Dr. R. W. McLean. Delegate is: Dr. R. W. McLean. Alternate is: Dr. Mervin Rosenberg.

Dr. James Little entered the Air Force for two years this past fall.

K. G. VANDERGON, M.D., Councillor

STANDING COMMITTEES

Committee on Medical Education

This committee has had no meetings this year, since there were no problems that required a meeting. The members of the committee have kept in close touch with Dean Harwood throughout the year.

This committee will have a meeting this year on Sunday morning at the time of the state meeting in Fargo.

Dean T. H. Harwood reports as follows, in regard to the present status of the Medical School and the new loan fund under Senate bill 181.

"I am outlining here a report on the Medical School as you requested.

"I am pleased to report that there have been relatively few changes in the faculty. Dr. Robert C. Holland and Dr. Vernon L. Yeager were new additions last year to the Department of Anatomy. John Vennes, of the Department of Bacteriology, who received his Masters Degree at the University of North Dakota in 1952, is with us again this year after completing his work for his doctorate at the University of Michigan at Ann Arbor.

"The Medical School, as well as the whole community, was saddened by the death of Kenneth E. Fritzell, M.D., who served as chairman of the Department of Surgery for the past three and one-half years. Dr. Fritzell died following a heart operation in Boston for aortic stenosis. Dr. Fritzell was not only an effective teacher, but was respected and admired by medical students as well as his associates. We were pleased to receive \$450 donated by his friends through the North Dakota Heart Association to be used for some phase of heart research or teaching.

"The University also received from the Alpha Phi Sorority \$600 for a student research fellowship in heart research.

"The school was pleased to receive in February, a check for \$4,398 from the American Medical Education Foundation through the A.M.A. and a check for \$12,505 from the National Fund for Medical Education, which is our share of the amount contributed to medical education by industrial groups throughout the country.

"There has been a respectable amount of research published by faculty members during this past year. The Medical School has received this year over \$93,000 in research grants from outside sources.

"This year we appear to have a reasonable number of well-prepared North Dakota resident students who have been accepted for next year. The class was filled about the third of March. Next year we have a deadline of January 1 for applications, so that we may be in line with most other schools and plenty ahead on our entering class.

"Last year we admitted 41 first-year students, of whom 37 were North Dakota residents. Our second-year class contains 39 students, of whom 37 will be transferring to complete their education. Nearly all of these students have been accepted for transfer. The remaining 2 students are taking a divided second year and will not be ready for transfer for another year.

"Our students last year transferred to a variety of schools. Kansas had increased their clinical facilities so that they were able to take 10 of our second-year students as juniors. Southwestern accepted 5, Northwestern 4, McGill 2, Bowman Gray 2, Pennsylvania 2, and 1 each transferred to Buffalo, Iowa, Tufts, Nebraska, Utah, Marquette, Vanderbilt, Jefferson, and Harvard.

"I am quite satisfied with the caliber of our students. They have little difficulty in transferring and appear to be doing well after transfer.

"Most of the students who are completing their internships are planning to enter military service for two years to complete their obligation. There has been considerable interest among our undergraduates in the program of the armed services, which allow them to be commissioned as reserve officers while medical students and to enter medical service with some longevity when the time comes.

"The Medical School has made every effort to acquaint the seniors with the internship and residency programs here in North Dakota and to encourage them to return here for that part of their training. With the sit-

uation as it is, with nearly twice as many internships open as there are medical graduates, it is understandable that many of our places are unfilled.

"Senate bill 181, passed by the 1957 legislature, created a loan fund from medical center funds. This is to make available up to \$75,000 a year as loans to third and fourth year North Dakota resident students who are finishing their medical school after transfer. The law provides for a board appointed by the Board of Higher Education to administer the program. Loans are to be made not in excess of \$2,000 per student per year for the third and fourth years. The loans become due and payable one year after the completion of internship, and bear an interest rate of 6 per cent annually from that date. If a graduate returns to practice in a town or municipality of 3,000 population or less which is without a doctor or which needs an additional doctor, each year of actual practice in such municipality shall be equivalent to repayment of one-fifth of the unpaid balance of the loan and of one-fifth of the accrued interest thereon. The arrangements for investigation of the student's need and the schedule for repayment is to be worked out by the loan board. The board is also directed to compile a list of towns which meet the requirements for those municipalities which would meet requirements for the loan forgiveness.

"As soon as Senate bill 181 became a law, a letter was sent to all third year students, since they are, under the terms of the law, eligible for these loans if they have been residents of North Dakota for two years before being admitted to Medical School. Of the 13 replies to date, 12 have indicated that they wish to apply for loans and have indicated, in the majority of cases, the full \$2,000. Of the present sophomore class who are eligible for loans this coming year, 23 have indicated their intention to apply for loans. On this basis, it would seem as though there will be a demand of nearly all of the \$75,000 made available under the legislation. As soon as the Board of Higher Education appoints the committee, details of the loan will be worked out.

"There is one innovation in the university, which began two years ago and ought to bear fruit in the future. This is the system of freshman counseling whereby each freshman in the university is assigned to an advisor. Each student who states medicine as his preference is assigned to a member of the faculty of the School of Medicine. We are, therefore, in contact with our students soon after they arrive on campus. This system promises to result in better guidance in preparation of our North Dakota students applying for medical school.

"Matching funds were obtained from the Hill-Burton Hospital Construction Program last July for construction of a Rehabilitation Center adjacent to the School of Medicine. Construction started in the late summer and has continued sporadically all winter. The building will be completed about November 1, 1957, and will be in operation sometime after that. There has been to date little actual detailed planning of our program. However, a rehabilitation director was hired April 1, who is here now and will work throughout the coming year in arranging details of our program. The director is Miss Frances Landon, who is well trained and experienced in this field. She comes to us from Arlington, Virginia, where she has been director of a rehabilitation program there.

"The legislative action in regard to establishing a hospital at the university for the treatment of tuberculosis will take much thought, study, and planning in the next few years.

"By the time this report is read, the clinical clerkship

for our second-year students will have completed its fifth annual session. This has been highly satisfactory in every way and the students appreciate the help it has given them in preparing them for their clinical work after transfer. The school is grateful not only to the doctors who have cooperated on this program but as well to the hospitals in Bismarck, Grand Forks, Rugby, Jamestown, Williston, Fargo, Dickinson, and Minot, which have made their facilities available to the students. The clinical clerkship has become an accepted and valuable part of the teaching program.

"The School of Medicine once again wishes to express its appreciation of the time and effort spent by the doctors of the state helping this medical school continue as a high grade institution."—T. H. HARWOOD, M.D.

Dean Harwood will report in person at the meeting of the Committee in Fargo. Anyone that is interested in the Medical School, or would like to ask Dr. Harwood any questions in regard to the Medical School, is asked to be present at the meeting of this Committee.

H. M. BERG, M.D., Chairman

Committee on Necrology and Medical History

*You have read deeply in the book of life,
And you have added lines that I shall keep
To be a shield against the petty strife
Until such time as I shall fall asleep.*

ADELE JORDAN TARR

WILFRED E. BLATHERWICK, M.D.

Dr. Wilfred E. Blatherwick, 85, retired physician who practiced for many years at Van Hook and Sanish, died April 7, 1956, at his home in Los Angeles.

Dr. Wilfred Blatherwick was the father of Dr. "Bob" Blatherwick of Parshall. Dr. Blatherwick retired in 1953 after fifty-two years of practice as a physician. He started practice at Rock Valley, Iowa, and in 1909 he moved to Drake, North Dakota. When the reservation was opened up for homestead entry in 1912, he took up a homestead and opened an office at Plaza. Two years later, he located his office at Van Hook, and, then, in 1927, he moved to Sanish.

In his youth, Dr. Blatherwick became a tennis player of some note. He won the Iowa state intercollegiate championship singles one year, and later was a doubles winner in tri-state championship at Sioux City. At one time he was rated as the tenth best amateur tennis player in the United States.

He was born on a farm near Waterloo, Iowa, in 1870. He graduated from Grinnell College, Mt. Vernon, Iowa, in 1895 and from Rush Medical College in 1901.

He was for many years a member of the North Dakota State Medical Association and in 1951 became a member of the association's "50-Year Club."

HENRY L. HALVERSON, M.D.

Dr. Henry Ludwig Halverson, 76, physician and surgeon in Des Lacs and Minot for many years, died June 6, 1956, in a Minot hospital where he had been a patient for the last few years.

Widely acquainted in medical circles in the northwest part of the state, he had served as Ward County health officer and as president of the North Dakota Health Officers Association.

Dr. Halverson was born at Cashton, Wisconsin, August 19, 1879, and was graduated from the College of Physicians and Surgeons, University of Illinois, in 1904.

He came to Des Lacs as general practitioner shortly after his graduation and remained there until 1929 when he was appointed Ward County health officer.

Completing his health officer work in 1936, Dr. Hal-

version began private practice in Minot. He was joined a few years later by his son, Dr. Clayton H. Halverson, who survives, as does a daughter.

HARRY J. FORTIN, M.D.

Dr. Harry J. Fortin, one of the state's best known orthopedists, succumbed in a Fargo hospital October 19, 1956, at the age of 66.

A week earlier, while hunting with friends, he had suffered a heart attack.

Dr. Fortin, through the Elks Crippled Children's Foundation, through the State Welfare Board, and through his private practice, had aided countless children in the area. He was known as "Dr. Harry" to hundreds of North Dakota children.

Dr. Fortin had been in practice in Fargo since concluding his medical education, except for some years with the Mayo Clinic. He was on the staff of St. John's Hospital.

Dr. Fortin was born March 28, 1890, in St. Paul, Minnesota, the son of John A. Fortin and Hannah Munson. The family came to Fargo in 1904, and he was graduated from Fargo High School in 1908. He graduated with the degree of bachelor of science from Fargo College in 1912 and from Northwestern University Medical School in 1916. He had done postgraduate study in Harvard and the University of Pennsylvania medical schools.

He married Adele Frisbey Hayden in Fargo, January 11, 1933. Besides his wife, he leaves a daughter, Mrs. Richard M. (Jean) Brown, Wayzata, Minnesota, and 4 grandchildren.

A member of the Episcopal Church, Dr. Fortin was a member of Shiloh Masonic Lodge, Scottish Rite bodies, El Zagal Temple of the Shrine, local, state, and national medical societies and the American Academy of Orthopedic Surgeons. He was a member of Phi Rho Sigma and Alpha Omega Alpha fraternities. Dr. Fortin had been a baseball player in his school and college days and was an ardent gardener, fisher, and hunter. He and Mrs. Fortin, who were members of the Fargo Garden Society, specialized in growing varieties of irises.

FRANK I. DARROW, M.D.

Dr. Frank I. Darrow died at his home in Fargo October 27, 1956, after a prolonged illness. He was 64. He had retired from active practice in 1947.

Born July 12, 1892, he was the son of Dr. and Mrs. Edward M. Darrow. His father was one of Fargo's earliest physicians and the first superintendent of health in Dakota territory.

Dr. Frank Darrow had practiced in Fargo more than 30 years and was associated with the original Dakota Clinic, which his father and his brother-in-law, Dr. Ralph E. Weible, founded in 1919. He helped found the present Dakota Clinic and adopted the specialty of internal medicine.

Dr. Darrow was a man of wide interests. He served as president of the Cass County Medical Society, the North Dakota State Medical Association in 1943, the Fargo-Moorhead Executives Club, and commander of the Gilbert C. Grafton post of the American Legion.

He had been potentate of El Zagal Temple of the Shrine of Fargo, sovereign of St. Felix Conclave, Red Cross of Constantine, and served as the medical member of the state athletic commission since its inception in 1935.

He also found time to fly and was granted a pilot's license in 1931, and, pursuing a personal hobby, became adept at sleight of hand entertainment.

In his college days in Fargo he gained reputation as an

athlete, winning 5 letters in basketball and 4 each in football and track. He was graduated from N.D.A.C. in 1912 with a B.S. in chemistry. He received his medical education at Johns Hopkins University in 1912-1916. He served with the medical corps in this country and in France in World War I.

Dr. Darrow married Maurine Anderson July 18, 1918, and they became the parents of 2 daughters. Mrs. Darrow and daughters survive.

J. A. JOHNSON, M.D.

Dr. J. A. Johnson, 80, former Bottineau mayor and physician at Bottineau for fifty-three years, died November 10, 1956.

He was born in Black River Falls, Wisconsin, November 3, 1876. His medical study was done at the University of Illinois medical school and he obtained his degree in 1903. Coming to Bottineau to practice medicine July 16, 1903, Dr. Johnson had served as a country doctor in the years of the homesteaders, and afterward built up a large surgical practice in the area. In 1953 the North Dakota State Medical Association honored him as both a "50-Year Club" member and an honorary member. He had been surgeon for the Great Northern Railway for 38 years.

As a physician at Bottineau, he was instrumental in starting the hospital which is now St. Andrew's. Before that hospital was started, Dr. Johnson had converted his own house into a 14-bed hospital. He had served as county health officer in the early years and also as coroner. During World War I, he served on the local draft board. In World War II, he was medical examiner for selective service inductees.

Dr. Johnson was one of the organizers of the old Border Medical Society and also was a member of the Northwest District Medical Society as well as of the state association, and of the American Association of Railroad Surgeons. He was mayor of Bottineau for many years and had served at one time as president of the Bottineau Community Service Club. He was a Mason and a member of Kem Temple of the Shrine at Grand Forks and for years had also been a member of the Odd Fellows.

He is survived by two daughters.

K. O. KNUDSON, M.D.

Dr. K. O. Knudson, 77, died unexpectedly November 22, 1956, in a Minot hospital.

Knute Otto Knudson was born May 7, 1879, at Benson, Minnesota, was a graduate of Benson High School, and a 1903 graduate of the University of Iowa.

In 1903, he set up practice in Glenburn. He retired from active practice in 1954. During World War I, Dr. Knudson served as a captain in the Army Medical Corps. He was stationed at Langley field hospital in Virginia.

He was a member of the Northwestern Medical Society, North Dakota State Medical Association, and a fellow in the American Medical Association. In 1953, he was honored by the state association as a member of the "50-Year Club."

In 1910, Dr. Knudson married the former Marie Asplund at Lake City, Minnesota, who survives.

FRED L. WICKS, M.D.

Dr. F. L. Wicks, 71, who practiced medicine in North Dakota for fifty years, forty-seven of them in Valley City, died in a Valley City hospital December 20, 1956.

Born in Albert Lea, Minnesota, March 2, 1885, he

received a degree in pharmacy from Highland Park College of Pharmacy in Des Moines, Iowa, and a medical degree from Keokuk (Iowa) Medical College.

He came to North Dakota to practice medicine in 1906, serving the communities of Sawyer, Norwicksfield, and Blaisdell and opened an office in Valley City in January, 1909. He limited his practice to eye, ear, nose, and throat and in later years to eye only.

He served as president of the North Dakota Medical Society in 1944 and 1945 and was a member of the State Board of Medical Examiners for ten years. In 1956, he was honored by the association as a "50-Year Club" member and also as an honorary member.

He was active in community affairs and in athletic activities and was a member of the Salvation Army Board and the Congregational Church.

He was a charter member of the Kiwanis Club here and its first full-year president. Up until last spring he had belonged to the service club for 32 years without missing a single meeting, one of the best attendance records in the international organization.

Dr. Wicks married Maud Yost August 20, 1912, in Somerset, Ohio. He is survived by his wife and 2 sons.

SYVER VINJE, M.D.

Dr. Syver Vinje, 87, long-time physician in Hillsboro and state senator from the eighth district, Traill County, for the 1935 and 1937 sessions died February 14, 1957, from a cerebral hemorrhage.

Born in Norway, April 30, 1869, Dr. Vinje came to the United States in 1882, settling near Henning, Minnesota. He graduated from St. Cloud (Minnesota) State Teachers College in 1892 and was in secretarial work two years.

In 1884, he came to North Dakota and was professor of mathematics at Mayville State Teachers College until 1898. In the latter year, he entered the medical school of the University of Minnesota, graduating in 1902.

He practiced ten years at Henning and came to Hillsboro in 1913, after a year at Grand Forks. He retired from active practice in 1953. Besides serving a term in the state senate, he had served as city and Traill County health officer and had served on the school board.

He had been honored by Hillsboro and the nearby community in 1948 for his long service and in 1952 was honored by the North Dakota State Medical Association as a member of the "50-Year Club."

He married Rebecca Halvorson in Henning, January 3, 1904. Other survivors include 4 sons, Dr. Ralph Vinje, Bismarek; Dr. Edmund Vinje, Hazen; Olaf of Grand Forks; and Harold, of Elgin, Illinois.

KENNETH E. FRITZELL, M.D.

Dr. Kenneth E. Fritzell, well-known Grand Forks surgeon, died February 19, 1957, in a Boston hospital where he had undergone heart surgery a week earlier.

Born in Minneapolis, February 17, 1908, Dr. Fritzell attended the local public schools and the University of Minnesota medical school. He graduated in 1931.

Dr. Fritzell joined the staff of the Grand Forks clinic after his discharge from the Navy in January 1946.

He was a member of the staffs of Deaconess and St. Michael's hospitals. He was a Great Northern Railway surgeon and head of the department of surgery at the University of North Dakota medical school.

Dr. Fritzell married Miss Stella Hauge of Cando, North Dakota, at Northwood in 1933. She and 4 children, Peter, Sarah, Eric, and Anna, survive.

Dr. Trygve Oftedal, 70, Fargo eye, ear, nose, and throat specialist, died unexpectedly in his home March 13, 1957. Death was due to a heart ailment for which he had been under treatment.

Born February 18, 1887, near Christine, then Dakota Territory, Dr. Oftedal was the son of the Rev. and Mrs. Gustav Oftedal. The family moved soon afterwards to Buxton, North Dakota, and then to Minneapolis where he graduated from high school.

Dr. Oftedal served in the Navy in World War I.

He received his medical degree from the University of Minnesota and practiced in Minneapolis until 1925 when he went to Conde, South Dakota. In 1927, he came to Fargo and had practiced there since.

His wife, who preceded him in death, was the former Gertrude Saxrud. They were married in Minneapolis, April 7, 1918.

He is survived by 1 son and 1 daughter.

VICTOR J. LA ROSE, M.D.

Dr. Victor J. LaRose, 83, Bismarck physician and surgeon, died March 21, 1957, in the St. Alexis Hospital, where he had been a patient for several months.

Dr. LaRose was born March 5, 1874, in St. Paul, Minnesota. He attended public schools there and the Minneapolis Academy before entering the University of Minnesota's medical school. He was awarded his doctor of medicine degree from the university in 1901 and interned at the St. Paul City and County Hospital.

On June 7, 1902, he became associated with Dr. E. P. Quain and the late Dr. N. O. Ramstad, who founded the present Quain and Ramstad Clinic. After two years, Dr. LaRose established a practice in Mandan, remaining there for four years. He returned to Bismarck and became a member of the clinic in 1909, continuing as such until his retirement in 1949.

Dr. LaRose was a founder and past president of the Sixth District Medical Society, a charter member of the North Dakota Tuberculosis and Health Association, serving as its president for many years; a past president of the North Dakota State Medical Association (1916); and a former member of the State Board of Medical Examiners. He was a fellow of the American College of Surgeons, American Urological Association, and American Medical Association.

During World War I, Dr. LaRose served as selective service examiner and was chairman of the American Society for the Control of Cancer. Dr. LaRose was chief of staff of the St. Alexis Hospital from 1918 until 1946 and headed the urological departments of both the Bismarck and St. Alexis hospitals for many years.

He was a past president of the Bismarck Rotary Club, a member of the Bismarck Elks Lodge, a fourth degree Knight of Columbus, and, in 1951, the association honored him as a member of its "50-Year Club" and made him an honorary member in 1952.

Dr. LaRose was a pioneer in the use of x-ray in the Northwest, inaugurating x-ray as a diagnostic adjunct in the days when hand-propelled x-ray machines were first built.

Dr. LaRose married the former Rose McHugh on June 12, 1906. The couple observed their golden wedding anniversary last year.

Survivors, in addition to Mrs. LaRose, include 2 daughters.

E. H. BOERTH, M.D., Chairman

Your Committee on Legislation had a comparatively active year. And, all in all, a rather successful year, thanks to the devotion of a number of medical men within your association and to the ever alert Mr. Lyle Limond, our association's executive secretary.

We had the eyes of one or another of the individuals on the committee on some of the 29 bills in the recent legislature that had some bearing on the association. A breakdown is as follows: Three bills were actively opposed, and they were defeated. Three bills received token opposition and were defeated. One bill received token opposition and was passed (I might add that this was the privilege granted to chiropractors to call themselves doctors, and not particularly harmful to the association in any manner.) Two bills were followed with interest, but not supported or opposed, and were defeated. Twenty other bills were passed with the support of the association, and some of those 20 bills were simply followed with interest.

The main bill that we, as an association, were interested in was the amendment of our Medical Practice Act or Senate bill 186. The Board of Medical Examiners had spent some time getting the bill drawn up during the past year. Lt. Gov. Clyde Duffey was kind enough to go over the bill after it had been drawn up and point out its weaknesses and recommend changes, as well as to delete repetitions which occurred in the sections of the bill and clauses that might be controversial and cause difficulty in getting it passed.

The only opposition we had was from our ally, the North Dakota Hospital Association, who wished to be included under the exemptions of our act. They were informed that we, as a legislative committee, could not do so and that the Board of Medical Examiners would not have the power to allow such exemptions to any association. A breakdown of the people within that association who actively worked against the bill is available in the secretary's office and may be obtained on request. One of the most powerful opponents of the act was Mr. Jydstrup, director of our "cousin" the Blue Cross.

I feel that there has been some espionage within our own house, and, because of that, possibly some action should be considered. What action, if any, can be taken is for the House of Delegates to decide.

The bill is now law, with some deletions, but non-harmful to the association and an immense improvement compared to what the law has been heretofore.

O. W. JOHNSON, M.D., Chairman

Committee on Public Relations

On the state level, Mr. Lyle Limond, the executive secretary and I again this year as last attended the Public Relations Conference in Chicago sponsored by the American Medical Association and there we were able to obtain the trends of the past year on the thinking on the national level with regard to the public relations of the medical man with the general public. Many appropriate ideas and suggestions were forthcoming from the meeting, and it has proved most beneficial to the chairman. Personal communications were sent out to various members of the committee on a state level. The chairman also was instrumental, together with the executive secretary, of promoting 2 conferences at which the physicians of North Dakota participated. The press conference and our four-day session at Grand Forks with the lawyers of North Dakota were attended by our executive secretary and several members of the association. It was a most profitable session from which came, I believe,

a greater understanding of the two professions and a marked step with regard to public relations was consummated.

Out of this joint meeting plans have been laid for a code of ethics of the two professions, and I am sure that this will be most valuable to the medical society of North Dakota in the future and further meetings have been prepared for the following year.

On the local level once again, Bismarck has carried on a career night for the youngsters of the surrounding trade area and has, through the cooperation of several civic minded physicians, set up a booth and has done a great deal toward furthering the medical profession in the eyes of the public in this area.

I am in hopes that in the future this committee will be able to function more on the local level. Thus far, its functions have been mostly on a state level.

J. T. CARTWRIGHT, M.D., Chairman

Committee on Official Publication

The Committee on Official Publication held no meeting during the year 1956. THE JOURNAL-LANCET was accepted at the meeting in 1956 as the official publication of our society. As there was no dissension regarding this decision and nothing has come up for discussion in the meantime, no meetings were deemed necessary.

The committee will welcome any suggestions should any member of the society desire any change in THE JOURNAL-LANCET concerning publication, number of reprints given of articles, and so forth.

E. H. BOERTH, M.D., Chairman

Committee on Public Health

During the past year, there has been no formal meeting of the Public Health Committee, so I have nothing to report from the committee as a whole. However, your chairman has served and is still serving as chairman of the State Polio Advisory Committee. I have participated in the hearings on legislation concerning the control of the milk supply in North Dakota, especially House bill No. 42. I also attended one meeting of the School Health Committee, which partially comes under Public Health.

In regard to legislation on the production and distribution of milk in the State of North Dakota, it is my opinion that the Public Health Committee and the municipalities of the state must be prepared to fight legislation, which will undoubtedly come up two years from now. House bill No. 42 first attempted to take the control of milk from the municipalities but was defeated, but I am sure that additional legislation will come up two years from now.

I also attended a meeting of the North Dakota Tuberculosis and Health Association, which considered the methods of control of tuberculosis in North Dakota.

PERCY L. OWENS, M.D., Chairman

Committee on Cancer

In 1956, \$16,000,000 was spent for research on cancer; \$28,000,000 is being spent in 1957; and, in 1958, \$48,000,000 will likewise be spent for research. Of course, a large part of this amount is being furnished by the United States Government. Nevertheless, the amounts are impressive and indicate the tremendous amount of work, time, and money that is being concentrated on cancer research. In skimming over the hundreds of research projects that are now in progress throughout the United States, we have noticed that the research trend seems to lean toward endocrines in cancer, attempting to establish the etiologic and therapeutic relationships between hormones and malignant tumors. Of the hor-

mones, the principal ones are pituitary, estrogens, androgens, and corticosteroids. The current medical literature has discussed most widely the rise of adrenalectomy and hypophysectomy in cancer of the breast. Dr. John H. Lawrence, director of the Donner Laboratory at the University of California in Berkeley, reports experimentally on proton irradiation and interestingly presented cases of complete proton irradiation of the pituitary gland in animals. This ray is very interesting in that it does not lose its effectiveness in strength at any distance.

In North Dakota, the committee's efforts have been directed to maintaining a watch over possible quackery existing throughout the state. At the moment, no evidence has been presented of any such activity. However, there still appears to be an occasional comment regarding some local setup in the vicinity of Underwood, North Dakota. A recent investigation by your chairman provided no evidence of this type of operation in that vicinity.

A new project has presented itself in North Dakota for our committee, which we hope we will be able to gradually establish over a five-year period, namely, that of establishing a cancer registry in most of the hospitals in North Dakota. This is also known as a tumor registry. Some of the larger hospitals in the state have already established a registry, some of which are very fine. After the setup has once been established, the method of keeping such a registry current does not require the full-time stenographic work one would presume. The North Dakota Cancer Society will have an exhibition at our state meeting in Fargo this spring. We urge all of you to stop for a moment at our booth and view the following: the objective of a registry; the dividends it pays; the organizational plan; how data flows to the registry; cross indexing by sight, names, hospital numbers, and so forth; diagnosis; treatment and follow-up will be explained in detail. Also, in the future, your committee chairman will attempt to contact most of the hospitals in the state, spending time especially with stenographers, and so on, in establishing such a registry. This will require a great deal of time, so we plan on devoting the next five years to this project. This will require the help of all members of the cancer committee and, in fact, all the doctors in the state.

The Cancer Caravan will present its seventh annual tour this spring. Many helpful topics are constantly being suggested for our Caravan which we appreciate very much. Numerous requests were sent in for discussions of treatment of cancer in the elderly, especially advanced cancer cases. We felt this would be an opportune topic to discuss as neglect of treatment of advanced cases often sends patients to quacks. The speakers this year are from the tumor and cancer clinics of the Presbyterian Columbia Medical Center in New York and Temple University in Philadelphia. Appearing at Williston, Minot, Devils Lake, and Grand Forks between April 23 and April 26 will be Drs. H. B. Wilcox and E. B. Self, prominent physicians and surgeons at Columbia University. Appearing at Fargo, Jamestown, Bismarck, and Dickinson between April 30 and May 3 will be Drs. R. R. Tyson and J. B. Emich, a surgeon and gynecologist, who are able and well qualified to discuss aspects of surgery in the elderly cancer patient. Our attendance in the past has been excellent, and we are looking forward to a continued large attendance. Again, let me urge you to send in your requests for future topics.

On the local front, doctors are urged to help the county commanders of the North Dakota Cancer Society by encouraging their work and being available for an occasional lecture when possible. It is a simple matter to

give an intelligent discussion on cancer as every doctor in the state is confronted with this subject. The county commanders are instructed to contact their local doctors when setting up their local programs. A short fifteen-minute talk is all that is necessary. The laity are doing a wonderful job in the cancer crusade and need the help and encouragement of every doctor, as, after all, it is the doctor who first sees the cancer patient; it is the doctor who makes the diagnosis; and it is the doctor who treats the patient.

Our national goal for cancer this year is \$30,000,000; whereas, the North Dakota goal is \$100,000. You are urged to give your time and money to help destroy the destroyer.

Remember, cancer strikes 1 in every 3 Americans, according to present rates.

Cancer today is the second cause of death in the United States.

More than 40,000,000 Americans now living will develop cancer at some time if present rates continue.

Cancer will strike 2 of every 3 American families.

Seven hundred Americans die of cancer every day.

Last year about 250,000 Americans died of cancer.

Cancer kills 1 man, woman, and child every two minutes in this country.

Approximately 80,000 Americans were saved from dying of cancer last year.

Similar figures could be quoted endlessly. However, they are impressive enough and so numerous so that we urge all North Dakota doctors to join our cancer crusade.

CARROLL M. LUND, M.D., Chairman

Committee on Medical Economics

The fee schedules continue to be the main portion of the work of the Committee on Medical Economics during the year 1956. During the month of June 1956, the committee favorably passed the x-ray fee schedule for the National Blue Shield contract, as submitted by Dr. H. M. Berg, Bismarck. The Committee on Prepayment Medical Care usually takes care of the Blue Shield and Blue Cross schedule. Another meeting on fee schedules was held October 13, 1956, at the Prince Hotel, Bismarck. The committee members present were: E. T. Keller, M.D., chairman; V. G. Borland, M.D.; E. G. Vinje, M.D.; R. W. Rodgers, M.D.; C. H. Peters, M.D.; E. J. Beithon, M.D.; C. B. Porter, M.D.; J. D. Craven, M.D.; E. J. Larson, M.D.; and V. J. Fischer, M.D. Other members present were: D. J. Halliday, M.D.; A. R. Gilsdorf, M.D.; W. H. Gilsdorf, M.D.; E. H. Boerth, M.D., and Lyle A. Limond.

The meeting was called to order by the chairman, Dr. Keller, at 4:10 P.M. with 100 per cent of the committee members present.

The members very carefully reviewed the work done by the Committee on Prepayment Medical Care on the 200 items marked with the asterisk in the nomenclature of about 1,600 items as provided by the Department of Defense in connection with the New Dependents' Medical Care Act, (P.L. 569), Eighty-fourth Congress.

The results of this meeting paved the way for a working fee schedule with the Department of the Army for the medical care program for dependents of personnel in the Armed Forces.

Our fee schedules and working relationships with the State Welfare Board and the Workmen's Compensation have been working satisfactorily on the basis of schedules which were determined several years ago. It was felt by some members of the Committee that these schedules should be revised in keeping with the present day fee schedules as dictated by economic situations.

A proposal was also made to develop a relative fee schedule for the entire state from which other schedules, such as Workmen's Compensation, Welfare Board schedules, and so forth, could be taken on a relative value.

A revision of the schedules and the formation of a relative fee schedule should be taken up as future work on this committee.

E. T. KELLER, M.D., Chairman

Committee on Veterans Medical Service

This committee has not been presented with any problems during the past year. There has been no need to call the committee into session. It is assumed that professional relationships between the Veterans' Medical Service and the North Dakota State Medical Association are entirely satisfactory.

A. C. FORTNEY, M.D., Chairman

Committee on Prepayment Medical Care

I am submitting a report for the Committee on Prepayment Medical Care of the North Dakota State Medical Association for 1956.

This committee met at Bismarck, North Dakota, on August 24, 1956, primarily to discuss and set up a proposed fee schedule for the dependent's medical care program for the Armed Services. Public Law 569 was passed by the Eighty-fourth Congress to establish a federally sponsored medical care program for dependents of men in the uniformed services of the United States. The purpose of this act is to create and maintain high morale throughout the uniformed services by providing an improved and uniform program of medical care for members of the uniformed services and their dependents.

Previously, the executive secretary of the association, Mr. Lyle Limond and I had attended a meeting at Chicago on July 27 to July 31, 1956. This meeting was called by the officers and board of trustees of the American Medical Association to discuss with the Task Force of the Department of Defense, the preliminary rules and regulations that would institute Public Law 569, which had been previously passed by the Congress of the United States and was to take effect on December 7, 1956. In essence Public Law 569 was to institute procedures and authorizations for civilian care of military dependents by civilian physicians and civilian hospitals. On August 10 to August 12, 1956, Dr. R. H. Waldschmidt, president of this association, Mr. Limond, and I met in St. Paul with the North Central Medical Conference composed of representatives of the states of North Dakota, South Dakota, Minnesota, Wisconsin, Iowa, and Nebraska, along with observers from several other states and with members of the Task Force of the Armed Services to further discuss and implement the proposed regulations for this law. On August 27, 1956, a contract committee, made up of representatives from each of these states, again met in St. Paul to go over details and work out in advance the type of contract that we desired and which we felt would be fair and equitable to the medical profession with a minimal of government interference and that would be consistent with good medical practice. Again, on October 21, 1956, Mr. Limond and I met with this same group in St. Paul and reviewed in detail the proposed contract submitted by the Department of the Army of the United States. Many revisions of the contracts and the rules and regulations were reviewed and resubmitted by the Department of the Army and Department of Defense throughout the summer and fall of 1956. This necessitated frequent conferences in Bismarck, St. Paul, Chicago, and Washington, D.C.

Throughout this entire period of negotiations, we were very fortunate to have the valuable assistance of the Wisconsin State Medical Society. We had their full cooperation and also the advantage of their legal talent, the assistance of their certified public accountants, their actuarial experience, and the capable assistance and advice of their entire staff throughout these negotiations.

Mr. Lyle Limond and I were appointed by the president of this association to negotiate a contract with the Department of the Army in Washington, D.C., on October 27 through October 31. Again, the Wisconsin Medical Society acted as our councillors during the negotiations of this contract. The council of the North Dakota State Medical Association designated the Wisconsin Medical Society as our fiscal agent. The actual fee schedule adopted was negotiated by Mr. Limond and myself after the Committee on Prepayment Medical Care, the Committee on Medical Economics of the North Dakota State Medical Association, and the council of the state medical association had given tentative approval to 200 items that were expected to be most commonly used. Of these 200 items that we priced before contract negotiations, 23 of these fees were questioned by the negotiating contract officers of the Department of the Army. We were able to uphold and sustain 13 of these without revision. On 10 items, we were compelled to give slightly at the time of negotiations. Following the adoption of these 200 items, we were asked to tentatively set up the fee schedule of the other approximately 1,200 items in the entire schedule. This was done by a formula which I believe has worked out to everyone's satisfaction and has given a maximum schedule which is fair to both the members of this association and to the Department of Defense. The contract, however, was not signed by the president of this association until it was reviewed in detail along with the entire fee schedule and had the approval of the council of the North Dakota State Medical Association.

This program went into effect December 7, 1956, and is under the direct supervision of the executive secretary of this association at his Bismarck office. However, according to the contract, a mediation committee has been appointed by the president of the association for the purpose of advising the executive secretary and also to advise the Department of the Army upon any disputes that may arise regarding the operation of this program within this state. All vouchers are submitted to the executive secretary's office at Bismarck, are reviewed by him and, when necessary, by the mediation committee before forwarding to the fiscal agent. These, in turn, are processed at that point for the Department of the Army and checks are issued through Mr. Limond's office to the respective physicians rendering appropriate service. Up to this point, we have not had sufficient experience with this program to predict the net results. There remain a few mechanical details of organization to be worked out, but no insurmountable obstacle is anticipated. According to reports, it is anticipated that the contract with the Department of the Army will be renegotiated in January 1958. At that time, sufficient experience will have accumulated to be of some help in renegotiation.

It also has been suggested by the Committee on Prepayment Medical Care that this association begin working upon a unit schedule similar to that previously adopted by the California Medical Association, so that, in future negotiations with any government agencies or other institutions, a minimum length of time will be required to review or set up a new fee schedule. If such a unit system were available in rating the relative unit value of each common medical procedure or surgical

procedure, the committee's sole obligation then would be to determine the value of the unit to be used. This would save much time and a great expenditure of effort for all concerned and, at the same time, would probably lead to a more equitable schedule for all procedures.

It is my desire to express my appreciation to all members of this committee, to the members of the Medical Economics Committee, and to the council and officers of this association for the maximum degree of cooperation and intense effort that was expended by all in initiating and preparing this program for the dependents medical care plan in such a short period of time before the effective date of December 7, 1956.

C. H. PETERS, M.D., Chairman

Committee on Rural Health

This committee did not meet in the year 1957.

Dr. W. A. Wright attended the National Rural Health Conference in Kentucky this year and gave a report on this conference at the North Dakota Public Health Association annual meeting in Williston.

Dr. M. S. Jacobson has had his hospital administrator write an article on "Rural Hospitals" for the Council on Rural Health. This article will now be published in some of the farm publications.

K. V. VANDERGON, M.D., Chairman

Committee on Nursing Education

There was no called, formal meeting of the Committee on Nursing Education for the year 1956-1957, because there was no apparent business or activity demanding such action. Continued contact with the executive office of the North Dakota State Nurses' Association has been maintained. During the legislative session, the Nurses' Association offered their help and expressed their interest to the medical profession in bringing their medical practice act up to date. Similarly, the same support was given the Nurses' Association in their state scholarship budget appropriation. A continued congenial and co-operative spirit exists between the North Dakota State Medical and Nurses' associations.

It has been suggested that the name of this committee be changed. It was thought that the title, "Nursing Education," does not entirely cover the scope of work and potential activities of this committee in liaison with the Nurses' Association. Particularly in mind was nurse recruitment, nursing careers, and other activities of nursing, in addition to nursing education, both for registered and practical nurses. Also, there are now several other fields that are most important to the practice of medicine, and these allied fields might well be included in the work and functions of this committee. At the present time, this could include dietitians, physiotherapists, occupational therapists, laboratory technicians, x-ray technicians, medical record librarians, and medical social workers. Other fields could be added as they might arise. Thus, a more appropriate title would be "Committee on Nurses and Other Fields Allied to the Practice of Medicine." Such a change would require a revision of the North Dakota State Medical Association By-laws, chapter VIII, section 2, number 5. Committee on Nursing Education.

It has also been suggested that this committee, or selected members of this committee, be represented, at least on the state level, on the Joint Commission for the Improvement of the Care of the Patient. On the National level, this commission includes representatives from the American Hospital Association, American Medical Association, American Nurses' Association, National League for Nursing, and National Federation of Licensed Prac-

tical Nurses. Accordingly, the State Joint Commission would include similar representatives from corresponding state associations or groups. At the present time, this commission has been inactive due to the illness of the North Dakota state chairman. However, it has been proposed that this commission once again become active. This will require active participation by representatives from the North Dakota State Medical Association. It is anticipated that at this time, the chairman of this committee and other interested members of this committee may be called upon to meet with this commission.

CHARLES A. ARNESON, M.D., Chairman

Committee on Maternal and Child Welfare

The Committee on Maternal and Child Welfare met in Fargo this year and submits the following for consideration:

1. We would like to commend the state legislature for passing legislation to protect records on research projects, such as maternal mortality survey, thereby preventing any possible lawsuits.

2. We want to encourage perinatal mortality studies in all hospitals of sufficient size to warrant it, in view of lowering the neonatal mortality.

3. We recommend that all pregnant women be given polio vaccine and that they be given a booster shot in each succeeding pregnancy; also, that all children be given booster shots as recommended by their physicians.

4. In view of a recent court decision, we further stress the importance of doing Wassermann and Rh factors on all obstetrical patients.

ROBERT E. LUCY, M.D., Chairman

Committee on Crippled Children

The meeting of the Committee on Crippled Children was held at the Gardner Hotel, Fargo, December 8, 1956, and was called to order at 9:15 A.M. by the chairman, P. L. Johnson, M.D. Members of the committee present were: P. L. Johnson, M.D., chairman; D. Lindsay, M.D.; A. E. Culmer, Jr., M.D.; L. B. Silverman, M.D.; J. J. McLeod, M.D.; B. A. Mazur, M.D.; Fred Behling, M.D.; C. W. Hogan, M.D.; and J. C. Swanson, M.D. Others present were: L. A. Limond, executive secretary, and W. E. Unti, executive director, North Dakota Society for Crippled Children and Adults, Jamestown.

The minutes of the last meeting held in December 1955 were not read, since they had been printed in the Handbook for the House of Delegates and acted upon by that body at the 1956 annual meeting of the North Dakota State Medical Association, held in June in Aberdeen, South Dakota.

1. A. Mr. William E. Unti, executive director, North Dakota Society for Crippled Children and Adults, Jamestown, was called on to speak about the activities of the society.

He reported that the Cerebral Palsy Clinic had been held for nine years in North Dakota and that 1956 was the first year in which it was not held. Mr. Unti suggested that the \$500 earmarked by his society for the Cerebral Palsy Clinic be used as a scholarship for a physician to take additional training in cerebral palsy. He asked for comments from the committee on this suggestion.

Dr. Silverman felt that a speaker sponsored by the society would be a better idea, particularly if the speaker would visit the district medical societies. This viewpoint was supported by Drs. Mazur and Lindsay.

Dr. Silverman moved that this committee recommend to the North Dakota Society for Crippled Children and Adults that funds be used to sponsor a speaker or speak-

ers at the district medical society meetings. The motion was seconded by Dr. Lindsay and carried.

- B. Mr. Unti next spoke on the summer training program of the society. This program has been provided for eight years and is cosponsored by the Crippled Children's School. Children between the ages of 3 and 12 are referred for admittance to the summer training program. Dr. Swanson felt that the 1956 summer session had been the best.

- C. Mr. Unti, in concluding his remarks, stated that the Committee on Crippled Children continues to act as the advisory committee to the North Dakota Society for Crippled Children and Adults (Easter Seal Society).

2. The program of the Division of Special Education of the State Department of Public Instruction was next discussed in connection with the 1957 session of the state legislature.

Dr. Mazur moved that this committee continue to give support to the Division of Special Education as was done in the 1953 and 1955 sessions of the legislature. Seconded by Dr. Culmer. Carried.

3. Dr. Paul Johnson discussed the work of the Crippled Children's Division of the State Welfare Department. He explained the expanded program of this department for the next few months.

Crippled Children's Services, Division of the State Welfare Department, at the request of many of the county welfare boards is endeavoring to ease some of their financial obligations. As a result of a survey of many of these boards, a list of approximately 14 conditions appeared to be those medical entities in which there was the greatest need for financial assistance. By including these conditions under the Crippled Children's Services List of Qualifying Conditions, the program could be expanded on a limited scale. This information is to be sent to all the physicians in the state to appraise them of the tentative additions to the program. It is also reiterated that the Crippled Children's Services desires to cooperate completely with the North Dakota State Medical Association in the general management of its program.

He also stated that spring clinics for Crippled Children were being planned. Dr. Culmer moved that the format used in the 1956 Clinics be used in 1957. The motion was seconded by Dr. Mazur and carried.

Dr. Johnson stated that from January 1, 1956 to December 8, 1956, 55 children with congenital heart defects were sent to the Variety Heart Hospital in Minneapolis. He further stated that 7 children had been sent to the Amputation Center at Grand Rapids, Michigan. Money is being saved by so doing, and there is room for rheumatic fever patients, and so on, by utilizing the above-mentioned facilities.

PAUL L. JOHNSON, M.D., Chairman

Committee on Mental Health

Members of the committee are: Dr. Freeman, Jamestown, chairman; Dr. Nierling, Jamestown; Dr. Christoferson, Fargo; Dr. Cartwright, Bismarck; Dr. Icenogle, Bismarck; Dr. Froke, Grand Forks; Dr. Geib, Moorhead, Minnesota; Dr. Kermott, Minot; and Dr. Vigeland, Rugby.

Drs. Nierling, Icenogle, Vigeland, and Freeman met at 3:00 P.M., April 12, 1957 at the State Hospital, Jamestown.

The 1956 proposal of the Women's Auxiliary of the American Medical Association of sending periodic "emotional growth and mental health" letters to high school seniors across the nation was briefly discussed. There

has been no further information regarding this project for the past year. No action was taken.

There was brief discussion of the relationship between the State Hospital facilities and the Grafton State School, the Mandan Training School, and the State Farm in regard to mental health. The discussion did not involve any specific points or program.

Dr. Freeman reported to the committee various changes and progress involving the State Hospital for the past year. This included considerable improvement of the physical plant, an almost double admission rate, together with a 10 to 15 per cent decrease in average daily population, considerably shorter average length of hospitalization, and considerable improvement in patient activity and liberty.

Dr. Nierling and the committee discussed some of the activities of the North Dakota Mental Health Association and more particularly the activities of the volunteers, both the local very active volunteers and those around the state who have been assisting the local volunteers. After this discussion, the committee adopted the following resolution: The Committee on Mental Health recommends close cooperation by and full support from the physicians of North Dakota to the North Dakota Mental Health Association and the local mental health committees and associations or the volunteers of the communities in order to build up a healthy public attitude toward mental health and mental illness.

The committee, upon learning of plans to have a meeting at the hospital for members of the mental health boards (the county judge, the state's attorney, and the appointed physician), recommended that this be supported by the North Dakota State Medical Association and that the meeting be open to any physician who wished to obtain additional information regarding procedures of admission to and the program of the state's mental health facility.

Following the meeting, the committee attended the interstate tele-communication program originating at the Nebraska Psychiatric Institute, which involves 4 state hospitals in the states of Nebraska, Kansas, South Dakota, North Dakota, and western Iowa. Dr. O'Neill, who is senior director of the 10,000-bed Central Islip State Hospital in New York, spoke on the subject of "Observations of the British Mental Health System," including a discussion of the highly developed community facilities, and 2 of the British mental hospitals which are completely "open" hospitals. Dr. O'Neill said that the voluntary admissions in New York were approximately 5 per cent of admissions. Dr. Freeman indicated that during the past year in North Dakota, 31 per cent of first admissions have been voluntary and 48 per cent of readmissions have been voluntary. The State Hospital at Jamestown has also increased its percentage of patients on "open" wards from approximately 5 per cent to over 35 per cent, with no real serious problems or difficulties.

JOHN G. FREEMAN, M.D., Chairman

Committee on Diabetes

The Committee on Diabetes, initiated by Dr. Leonard Larson of Bismarck, has continued its primary function to encourage and coordinate annual diabetes detection drives throughout the state under sponsorship of constituent local medical societies. This function is a cooperative effort in support of National Diabetes Week, sponsored in November of each year by the Committee on Detection and Education of the American Diabetes Association, Inc. The number of district medical societies

participating in this program throughout the nation is steadily increasing.

Three district medical societies approved local diabetes detection drives in November 1956; namely, the Kotana, Grand Forks, and Northwest District Societies. While funds were voted for the Grand Forks District Society program, the drive was postponed until 1957 due to lack of voluntary personnel to process the tests.

The Kotana District Society carried out 700 tests, but discovered only 1 new case of diabetes.

The Northwest District Society carried out 1,570 tests, discovering 6 new cases of diabetes.

The anticipated yield of new cases of diabetes in a detection drive should range from 1 in 500 to 1 in 100 or more, depending upon the age of the groups screened.

While diabetes detection should obviously be a year-round program, the recent consensus of the Committee on Diabetes is that district societies would find it more practicable to conduct a detection drive about every two years. Such programs should be staggered among the district societies so that roughly half of the total societies would be participating each year. However, the American Diabetes Association believes that the existence of about 1,000,000 unknown cases of diabetes in the United States justifies at least an annual drive to ferret out as many new cases as possible since, in the opinion of most authorities on this disease, early treatment is of the essence to keep the disease milder and devoid of subsequent complications.

Consideration is being given to the use of the glucose oxidase reaction (Testape or Clinistix) as a self-testing device for future detection programs.

E. A. HAUNZ, M.D., Chairman

SPECIAL COMMITTEES

Committee on Geriatrics and Rehabilitation

The program of rehabilitation in the state should be taking a fairly definite form within the next year. The anticipated completion of the Rehabilitation Center at the Medical School in Grand Forks about November 1 and the start of operations a few months later should not only provide some needed services within the state, but in program planning should correlate and coordinate some of the programs already under way throughout the state. To date, the large part of our energies has been devoted to details of construction. In the next few months, considerably more attention will be given to details of program planning. To that end, we have now with us Miss Frances D. Landon as executive director of the Rehabilitation Unit. Miss Landon is experienced in the area of rehabilitation, and among her other duties will be the correlation of our activities with all other groups.

We hope to have a meeting of the committee prior to the annual meeting of the state society. In that event, we will submit a supplementary report at that time. We trust that the members of the state medical society do not feel neglected in our planning. Actually, we have done very little program planning as stated above, but have concentrated our efforts on the building.

T. H. HARWOOD, M.D., Chairman

Committee on Foreign Trained Physicians

The Committee on Displaced Physicians has terminated this year and has been replaced by a Committee on Foreign Trained Physicians.

To review, of the 15 displaced physicians given temporary licenses between 1949 and 1952, 9 have received a full unrestricted license, and of these 9, 4 have left the community which sponsored them; 1 has retired because

of illness; and 4 remain in active practice in North Dakota. Four remain to take the examination this July for unrestricted licensure.

The opinion of the Board of Medical Examiners expressed in 1950 to the effect that displaced physicians are not the answer to the problem of the care of the sick in rural areas is being vindicated now; only 5 doctors with a full license remain in the community where they originally located.

The situation in Minnesota is essentially the same. Of the 112 foreign physicians licensed there, only 14 are taking up practice in smaller communities. Of the number remaining, 13 are taking up work in state and county hospitals where medical men are very much needed; a few are continuing on in hospitals for further training; some are in postgraduate work or teaching capacities; 20 are in military service and may return to Minnesota. Twenty applicants, who are licensed, have left the state. The above figures are from May 1949 to November 1956.

The problem, and in my opinion it is a problem, of graduates of foreign medical schools involves every board of licensure in the United States and individually affects every practicing physician, except in those 12 states where foreign graduates are not eligible for licensure under any conditions.

May I quote a few figures?

In a five-year period, 1950 to 1955, there were 3,953 foreign graduates licensed in the United States and, in the past ten years, the number is 6,865. New York has licensed 1,862, Illinois 971, and Ohio 751. The mortality rate in their examinations has been around 56 to 58 per cent. In 1956, there were 6,000 foreign graduates acting as interns and residents in the United States; many are not licensed and our mental and tubercular hospitals in every state are largely manned by foreign graduates.

During 1955 and 1956, there were 907 foreign graduates licensed in the United States, 452 foreign citizens in United States Medical Schools and, conversely, there are 1,386 United States citizens enrolled in foreign medical schools, principally in Switzerland, Italy, Belgium, and the Netherlands.

The Hungarian medical schools are of interest due to the uprising in that country, which has resulted in 9,253 Hungarians entering the United States up to January 1, 1957. About 1,000 of them are professional men, and about 30 to 50 of these are doctors. The immigration quota established by Congress is 21,500. Hungary has 4 medical schools. During 1955, 63 of these schools were examined by several licensure boards in the United States with a mortality of 59 per cent. The United States and Canadian medical graduate mortality rates vary from 3.7 to 4.4 per cent.

The North Dakota State Board of Medical Examiners has recently adopted the Michigan plan for the appraisal of medical graduates of foreign schools.

"Requirements for Medical Licensure of foreign graduates in North Dakota:

"1. He must provide evidence of being a graduate of a school giving a course equivalent to the American medical schools and have served a year's internship.

"2. He must present himself at the University of North Dakota for examination in conversational English and the basic medical subjects as required of second year medical students. The time for these examinations can be obtained from the dean of the Medical School.

"3. Passing these examinations, he is eligible to take the examinations given by the State Board of Medical Examiners which are held in July and January.

"4. Upon satisfactorily completing these medical ex-

aminations, he is given a temporary license. This license becomes permanent by the end of six years continuous practice in North Dakota and/or by becoming an American citizen. If citizenship is not attained in this period of time, the license is revoked."

A graduate is considered foreign if he is from any medical school outside of the United States and Canada. Since there is no way to evaluate foreign medical schools, we must judge each such graduate on an individual basis and the above plan, while not perfect, would seem to be the most equitable.

On a national basis a cooperating committee is now in the process of formation. It will consist of two men from (1) Federation of State Boards, (2) American Medical Association, (3) Association of American Medical Schools, and (4) American Hospital Association.

It will be their purpose to evaluate foreign medical graduates by means of an examination, consisting of some 400 objective questions. Eventually some of these examinations may be given outside of the United States. No decrease in the number of foreign graduates migrating to the United States is expected in the next few years, and every mail brings letters from Argentina and Turkey, Persia and China, England and South Africa, asking information as to the possibility of medical licensure in North Dakota. Unfortunately, few schools outside of the the United States and Canada equal our high standard. All licensing boards are under considerable pressure from communities seeking a doctor and from politicians seeking to please their constituents to license foreign graduates who are not educated and trained as thoroughly as American graduates. The members of these boards are under oath to carry out their duties without fear or favor and must do so if the American people are to receive the high type of medical service they are entitled to.

C. J. GLASFEL, M.D., Chairman

Committee on Emergency Medical Service

Some progress has been made in planning for emergency medical service throughout the state. In a recent survey of North Dakota hospitals made by the Disaster Planning Committee of the North Dakota Hospital Association, replies were received from 36 of the 60 hospitals queried.

The 36 replies included the hospitals in all the major cities of the state.

	Major cities	Total communities
Hospital staffs organized to function in disaster	8	12
Hospital staffs in process of organization	2	5
Hospital staffs without organization	8	18
Hospitals with organized disaster plans	6	11
Hospitals with plans being developed	10	10
Hospitals with no plans	2	14
Communities with organized disaster plans	5	10
Communities with no organized plans	6	18

It is evident that, while considerable progress has been made, much remains to be accomplished.

R. F. NUESSELE, M.D., Chairman

Committee on American Medical Education Foundation

The American Medical Education Foundation has raised more this year from individual physicians than ever before. The amount represents a 25 per cent increase over what the Foundation was able to do last year. Since it was organized in 1951, the Foundation has given nearly \$6,000,000 to the medical schools.

Let us not overlook the part the Woman's Auxiliary has played in this effort. Since 1951, they have contributed

\$281,392.84. In 1956, the women contributed \$106,000, and their 1957 goal is \$140,000. They are doing a remarkable job.

Medical graduates are increasing each year. Last year the figure was 6,845 and by 1960 the number is anticipated to be well over 7,000. It is important to note that tuition in 1956 accounted for only 18.2 per cent of the total cost of basic medical school operating budgets.

Our state has chalked up its best year. More men are making their alumni donations through the American Medical Education Foundation and this past year the total donations for North Dakota went over the \$5,000 mark. There were 111 donors, which again represents an increase in our participating members.

It has been a most gratifying year, and on behalf of the state committee I would like to thank all participants. I would also like to thank Dr. K. G. Vandergon who attended the annual meeting in my absence.

W. E. G. LANCASTER, M.D., Chairman

Committee on Constitution and By-Laws

The only suggested revision of the constitution pertains to section 2 of article IX, which relates to "Officers." The present section 2, which was suggested at the revision presented to the 1956 annual session reads as follows: "The president, president-elect, vice-presidents, secretary, and treasurer shall be elected annually by the House of Delegates to serve for a term of one year. The councillors shall be elected by the House of Delegates annually to serve for a term of three years, but a councillor shall not serve more than three full terms."

The revision suggested at this time is as follows: "The president, president-elect, vice-presidents, secretary, and treasurer shall be elected annually by the House of Delegates to serve for a term of one year. The councillors shall be elected by the House of Delegates annually to serve for a term of three years; the limit of consecutive terms shall be two. In instances where councillors are elected to fill the unexpired terms of previous councillors, the portion of the unexpired term shall not be included in the limit of the two consecutive terms referred to above."

The effect in general of this would be that under usual circumstances, a councillor would serve for two terms of a total of six years and would then be replaced, but would be eligible at a later date to be again elected to the council.

Since this is a change or amendment to the constitution, it cannot have final action until the 1958 annual session.

Suggested changes in the by-laws, section 1 of chapter 2, which relates to annual and special sessions of the associations, now reads as follows: "The annual session shall be held for four consecutive days beginning on a Saturday, which period of time shall include the first Sunday in May."

Since it is not always possible to schedule a meeting at that time, the suggested change is as follows: chapter 2, annual and special sessions of the association, section 1. "The annual session shall be held for four consecutive days beginning on a Saturday, which period of time should include the first Sunday in May."

Another suggested change is in regard to committees, and it moves the Committee on Diabetes and the Committee on Mental Health from the list of special committees to the list of standing committees. The suggested change is as follows: Chapter 8, committees, section 2 Standing committees of the North Dakota State Medical Association shall be:

1. Committee on Scientific Program
2. Committee on Medical Education
3. Committee on Necrology and Medical History
4. Committee on Public Health
5. Committee on Nursing Education
6. Committee on Maternal and Child Welfare
7. Committee on Crippled Children
8. Committee on Public Relations
9. Committee on Legislation
10. Committee on Official Publication
11. Committee on Medical Economics
12. Committee on Veterans Medical Service
13. Committee on Prepayment Medical Care
14. Committee on Rural Health
15. Committee on Cancer
16. Committee on Diabetes
17. Committee on Mental Health

Section 3. Special committees may be appointed annually by the president. It is suggested that the president consider annually the formation of special committees as follows:

1. Committee on Geriatrics and Rehabilitation
2. Committee on Constitution and By-Laws
3. Committee on Foreign Trained Physicians
4. Committee on Emergency Medical Service
5. Committee on American Medical Education Foundation
6. Liaison Committee to the North Dakota Hospital Association
7. Liaison Committee to the North Dakota State Pharmaceutical Association
8. Liaison Committee to the State Bar Association
9. Advisory Committee to Public Assistance Division of Public Welfare Board
10. Committee on School Health
11. Nominating Committee

Attention is invited to the fact that these changes in the by-laws are allowed to have final action at the 1957 annual session.

ROBERT B. RADL, M.D., Chairman

Committee on School Health

Your chairman of the School Health Committee met Mr. Limond on September 27, 1956, to outline the work of the committee. Several men associated with the Bismarck schools and the Special Education Department were contacted relative to the plan. On December 8, 1956, the committee on School Health met in Fargo at the Gardner Hotel, and the minutes of this meeting are as follows:

The meeting of the Committee on School Health was called to order by the chairman, R. W. McLean, M.D., at 2:00 P.M. with committee members, Dr. W. H. Gilsdorf and Dr. P. L. Owens present. Lyle Limond acted as secretary.

I. Dr. McLean felt that students of low I.Q. (60 to 80), as well as behavior problem students, were not getting sufficient attention in the public school systems in many sections of the state. He also stated that thought should be given to the possibility of establishing a special classroom for these students in each county. Dr. McLean further stated that he thought that this undertaking lay in the province of the Division of Special Education of the Department of Public Instruction.

The plan of action to be undertaken to enter a child in the special classroom under this proposal would be as follows:

1. Family physician recommends child for special classroom.

2. Superintendent of school system in which child is enrolled also recommends sane action.
3. Child is given a psychological examination by the state psychologist or by a psychologist specified by the Division of Special Education to pass on the above screening (points 1 and 2) before admission to the special classroom.

The committee members present discussed thoroughly the above proposal and recommended the following:

"The Committee on School Health of the North Dakota State Medical Association recommends (pending approval by the council of the North Dakota State Medical Association) to the Division of Special Education that serious thought be given to ways and means of extending its present program of activities for aiding the educable mentally retarded children and behavior problem children through special classrooms in each county and/or with the classrooms possibly associated with our teacher training institutions. It is further recommended that such a program commence with the first grades in our public schools."

II. The committee members present also recommended that each child in our public schools should be tested by the teacher as to vision and hearing. The superintendent of public instruction should be informed of this recommendation.

III. The committee members suggested that the superintendent of public instruction should take under advisement the possibility of having a physician give lectures in sex hygiene (physiology) to students of junior high school age on the basis of local option.

Meeting adjourned at 3:20 P.M.

Your chairman also met in Bismarck with the Legislative Committee and the program was discussed. The Special Education Division of the Department of Public Instruction met with the Senate Appropriation Committee of the state legislative session, to obtain funds for such a program. However, because of lack of funds, this program cannot be started at the present time. The Special Education Division appreciates the backing of the medical association on such a program.

Your chairman would appreciate the backing of all doctors throughout the state during the next two years in trying to educate the public for these needs and to make future plans for the next legislative session to act on. Since special education for the mentally retarded is becoming such a problem throughout the country, we, as physicians, should do our utmost in helping to obtain facilities for our children in this state.

Your chairman plans on being present at our state meeting and will be happy to discuss or clarify any questions pertaining to this report.

ROBERT W. McLEAN, M.D., Chairman

Liaison Committee to the North Dakota Bar Association

PROPOSED NORTH DAKOTA INTER-PROFESSIONAL CODE
(Form agreed upon by committees of the state medical
association and state bar association for final
approval and adoption)

GENERAL PRINCIPLES

Doctors of medicine, as the advisors and confidantes of their patients in matters of health; and attorneys at law, as advisors and confidantes of their clients in business, legal, and personal affairs, often have a joint interest of their patient-client to serve. This is particularly true when the attorney at law serves as advocate, whether his client be plaintiff or defendant, in a claim or adversary proceeding in court.

The professions of law and medicine are obligated to respect and honor each other. Neither the fact nor the appearance of incompetence, corruption, dishonesty, or unethical conduct on the part of individual members of either profession can be tolerated. It therefore follows that each profession must vigorously support within its own ranks, as well as in the ranks of the other, those ethical concepts which each has found necessary to the public good. The members of both professions are vested with high responsibilities and privileges for the purpose of serving the public with honor, dignity, and effectiveness.

Where the professions converge in serving the interests of a single patient-client, it is elementary that the service of each profession to that person may be more effective and cooperative if a complete understanding of the philosophy, province, and ethics, as well as the methods employed, for and by the member of each profession in that service be fully understood by the member of the other profession. It is to promote that mutual understanding between the members of the professions of law and medicine, to the ultimate good of their patient-client, that the state medical association and the state bar association of North Dakota have evolved and adopted this interprofessional code.

1. *A doctor of medicine and his patient.* The medical profession agrees to the obligation of the patient's attending physician to supply the medical facts necessary in a personal injury case, for without this information a true evaluation of the injuries is impossible. The physician accepts the further responsibility of explaining such facts in such a manner that the attorney understands them and can determine their relationship to his client's cause. The physician's information should embody the extent, degree, or percentage of illness, injury, or disability or other judgments based on his professional knowledge of a case. Since optimism in outlook and reassurance to the patient are an incentive to strive for a better result from treatment, it should be appreciated that the objective outlook may be somewhat more pessimistic to the attorney than that given to the patient. Accordingly, the physician's opinions should be as objective as he is able to make on the basis of the true evaluation of all the facts concerning the case.

2. *The attorney and his client.* It is the duty of the attorney, when counselling his client, in particular toward the institution of or the defense of a suit or proceeding, to ascertain fully the facts, insofar as possible, on both sides of the dispute. The attorney is required by his oath not to counsel or maintain any suit or proceeding which shall appear to him to be unjust, or any defense unless he believes it to be honestly debatable under the law of the land. Once undertaken, he is required in maintaining a cause or a defense, to employ such means only as are consistent with truth and honor and will never seek to mislead judge or jury by any artifice or false statement of law or fact.

To ascertain and marshal the facts, it is necessary, increasingly, for the attorney to obtain both facts and professional opinion from the doctor of medicine on the cause at issue. He will, therefore, ask the doctor of medicine for all the facts, and all the doctor's conclusions and opinions thereon.

From that point on, there may be a divergence in the philosophy of the two professions, caused by the system under which justice is sought to be accomplished under the American legal system. It is important that the doctor of medicine understand that American legal proceedings are conducted by the "adversary system." The attorney

is not alone an officer of the court, but the single minded advocate for his client and his client's cause. He does not and cannot properly represent both sides to a dispute. It is our American belief and system that truth can best be ascertained and justice most satisfactorily accomplished if each contestant in the dispute at law presents his point of view and all of the facts which tend to prove and establish his point of view separately to a neutral third person, either judge or jury, who can weigh and determine the facts under existing law. The attorney, therefore, in fulfilling his duty and representing his client, will present only his client's cause and the facts which support his client's cause. His adversary will do the same from the other side of the table, both seeking to best present the single one-sided point of view. The objective weighing and exercise of judgment is done by the judge, administrative officer, or jury.

Under this system, the facts are developed by testimony in question and answer form. Each question is designed by the attorney to elicit a certain item of fact, and it is the attorney's province to judge the effect, weight, and use of such facts for the preparation and presentation of his client's cause. The doctor of medicine, in testifying either on deposition or in court, is, therefore, necessarily limited and should limit himself to responsive answer to the question then put to him to the best of his ability and knowledge on that particular question directed to him. Under the laws of evidence, if he volunteers other information, adds anything not in direct explanation of his answer to the particular question, or has not foundation of fact or in medical art for his answer, it will be stricken, time will be wasted, and the doctor may be embarrassed.

3. *Interprofessional conference.* By reason of the fact that the attorney, who has heretofore developed information from the doctor on a report and discussion basis, will be limited in the presentation of a cause to the question and answer method and will seek to present only that which favors his client's cause under the adversary system, it is vital for the assistance of the doctor in preparation of the cause by the attorney that conference be held between the two professional men on the common problems presented in a particular case. Such conferences should be arranged early in the proceeding at the mutual convenience of each, in full appreciation that to each profession time is of the most importance. It should be held early because the present federal rules and the new North Dakota rules of procedure will allow counsel on either side of a dispute to examine not only his own witnesses but those on the other side under oath and for the record for the purpose of disclosing all facts necessary to the presentation or defense of a cause in advance of actual trial.

The attorney, in such conference, should outline succinctly to the doctor what he desires to develop and, in general, the form of his questions and order of them and, in particular, any hypothetical questions which state many assumed facts. The doctor, on his part, should feel obligated to point out anything which he believes will be helpful in presenting his patient's case, as well as the weaknesses therein or in the opposing medical theories or testimony.

A brief time spent in full conference will save the doctor not only time but possible embarrassment or, in any event, long cross examination when he is actually giving his testimony on either deposition or in court. It will also fully apprise the attorney of what can be developed from the doctor's testimony, allowing him to limit his examination and his questions to that material, resulting

in a saving not only his own time but also the doctor's.

4. *Reports to attorneys.* Doctors must appreciate that the promptness in providing a patient's attorney with full meritive information that he has available on his patient is of utmost importance to the legal rights of the patient-client. Many matters can be settled out of court to the mutual satisfaction of the parties involved upon such reports. Undue delays and failure to give a full meritive disclosure in providing medical reports may prejudice the patient's opportunity to dispose of the problem or to make settlement. A complete factual meritive statement which details the examination, diagnosis, treatment, and prognosis may well eliminate any necessities for further involvement of the doctor in legal proceedings and, in any event, will enable the attorney to limit the ground which must be covered to properly prepare his client's cause.

5. *Responsibility for and payment of medical fees and services in connection with legal proceedings.* Much later misunderstanding may be avoided by a clear statement in writing by the attorney at the inception of the case in contacting the doctor, and by the doctor in submitting in his first report to the attorney the arrangement proposed and accepted concerning payment.

In general, however, it should be understood that the following rules will apply:

a. Fees for medical services in treating the patient before, at the time of, and after his representation by an attorney in a claim are on a basis of the doctor-patient relationship, and the attorney is not responsible for the payment thereof.

b. It is the patient-client's duty in presenting his facts to his attorney to provide him with medical information as part of the facts and the first preliminary narrative report as to diagnosis, treatment, and prognosis, and in continuing reports while the patient is under treatment are facts which should be supplied by the patient-client to his attorney at the patient's cost and should be charged by the doctor to the patient.

c. Once the patient has become a client of an attorney, further and more detailed reports, conferences, explanations by the doctor of factors, x-rays, statements, and medical background are matters involved in the preparation, prosecution or defense of the claim, and, while a patient-client is primarily responsible, the attorney should accept responsibility for the payment of fees in connection with these services. Whether he obtains the funds from his client or out of claim payments or otherwise, bills for such services should be rendered to the attorney and he should accept the responsibility for their payment. This includes time spent in conferences, travel, and getting depositions and expert witness fees in court for the doctor.

(d) The charges of the doctor for medical attention, reports, conferences, and testimony should never be contingent upon recovery. The fact that a claim has been made or a lawsuit is pending should not influence the amount of the charge, which should conform with the reasonable fee schedule in the locality or community for like services to any patient and like amount of time spent out of the office or in the office. Opposing counsel may inquire of the doctor when he is under oath in deposition or in court whether he is being paid for his services and how much. He should, therefore, be prepared to state what his fees and charges for his services are and to be able to state they conform with reasonable charges in the community.

e. It is understood that when the attorney represents the client for a contingent fee, he has a lien upon the

client's cause of action. It is, therefore, the duty of the attorney to see that all medical fees and all reasonable charges of the doctor for services in connection with the litigation are paid in full out of any monies of the client into the attorney's hands before disbursement of such monies to the client. While the attorney is not personally responsible for his client's medical fees and treatment, he will devote every effort toward cooperating to the end that the doctor's fees and charges be fully paid.

f. It is urged that even in the simplest matter, a fair written statement regarding the limit of responsibility accepted by the attorney be submitted to the doctor at the outset and a firm understanding arrived at then of the exact situation. This is especially true where the matter is involved and special arrangements may be necessary and where very large amounts are involved, perhaps beyond the ability of the patient-client to pay.

g. It is understood that, in all cases, special arrangements in definite form will be made with the doctor by the attorney for special x-ray, ethology, exploratory medical services, or other types of special service necessary to the presentation of the client's cause.

6. *The doctor and court arrangements.* It is the doctor's obligation to both his patient and his fellow professional man to be in court at the time requested. Timing is not only important for the orderly and advantageous presentation of the patient-client's case, but also for the convenience of court, witnesses, the jury, attorneys, and other litigants.

Courts and attorneys must appreciate also that the physician has continuing and often unpredictable responsibilities to his patients. It must, therefore, be anticipated that, at times, courtroom procedures must give way to humanitarian considerations, and the physician be permitted to testify "out of turn" or arrange such delay as may accommodate an emergency. Courts and attorneys will undertake in every way to determine when and approximately how long the doctor will be needed in court. However, to the mutual advantage of both parties, the doctor should be available by telephone, having been given advance notice, and make every attempt to arrange his professional affairs to coincide with orderly presentation of his testimony. The doctor should understand that not convenience but emergency should be the reason for special "out of turn" arrangements.

In this connection, it must be understood that the attorney must serve the best interests of his client, and that the doctor may be subpoenaed to appear at a certain time and to be present at court until reached, in which case only the judge can make arrangements for emergency, and the wish of the doctor to avoid involvement will not have any bearing.

Generally, no attorney will resort to a subpoena and enforce the presence of the doctor at a certain time, unless required so to do by the necessities of his client's case and the doctor's refusal to cooperate. It is earnestly hoped that an understanding of the dependency of the patient-client upon both professions to secure justice to his cause and an understanding of the needs of each member of these professions will lead to helpful cooperation.

A doctor, subpoenaed as a medical expert, cannot reasonably be held to special study, review of the authorities in medical literature, or to other specialized preparation in such circumstances. He may, however, be required to state the substance of his observations if he has observed the patient and if he has a professionally adequate basis for an opinion or an answer to a hypothetical question and has such an opinion, he is obliged to state it under

oath. He is, however, entitled to state that he has been subpoenaed, what his observations of the patient have been limited to, and upon what basis he is required to form his professional opinion. If he can answer a hypothetical question, he must do so. If he cannot answer it without special study or the question itself does not contain sufficient facts upon which he can form an opinion, he should so state.

7. *Voluntary statements by doctors to either side of a cause.* The one-sidedness of the adversary system has been set forth for understanding. Attorneys are under ethical obligations, first, not to handle both sides of the case and, second, not to deal with the parties to the other or adverse side except through the latter's attorney. This principle of adverse interests is not always well understood by the doctor, who is trained to think only in terms of patient interests, treatment, and cure. The result is that in some situations doctors may offer observations or opinions to both sides in a particular proceeding or lawsuit or may submit to voluntary interviews by attorneys for both parties, which may result in embarrassing and difficult to explain situations.

Attorneys recognize that a physician's integrity and judgment are among his most precious assets and that neither should ever be "purchased." On the other hand, when a physician has been asked to offer his testimony on behalf of a patient or as an expert on behalf of a particular claimant he should not needlessly complicate the case by making himself available to representatives of the other side, or by offering apparently inconsistent viewpoints to two or more parties or their attorneys. The physician is also bound to respect the confidences of his patient. On the other hand, if the physician is employed for an examination for the purpose of a party or attorney adverse to the person examined, he is not at liberty to reveal voluntarily his findings to either the person examined or his counsel.

The best rule to be set forth by this understanding is: When a doctor has agreed to offer testimony on a case and is approached by attorneys or other representatives of parties with adverse interests, he should be frank about his prior commitment, notify the attorney for the party for whom he has agreed to testify or for whom he made an examination, and thereafter be guided by the advice of that attorney.

As before mentioned, under present rules in federal and after July 1, 1957, in North Dakota courts, adverse parties or counsel may examine the doctor prior to trial under oath, but such is a court proceeding on notice to the attorneys involved, and the doctor will be advised by the attorney in such case.

8. *The doctor as a witness.* The attending doctor is a witness. As such he should never assume the role of the advocate. His patient is represented by an attorney who serves in that capacity, and has that training. Nor should the attorney engage in examination of the doctor as a hostile witness. The doctor is a provider of facts, which he will give in response to questions directed to him by the attorney in order to elicit those facts. The doctor should listen to the question and answer in response to it, and in response only. He has a perfect right to state that he does not understand the form of the question and desires that it be restated. When, however, it has been stated, upon grasping the question, he should answer the question and confine himself to the specific answer required. Again, however, if the answer requires more than a "yes" or "no" and some form of explanation, he may give such explanation. If any attempt is made to prevent

him from that, he may appeal to the judge to allow him to explain his answer.

The doctor should at all times in court show respect and consideration to the judge and to the attorneys. The doctor is entitled to the respect and consideration of the court and attorneys and will receive much more courtesy when he gives courtesy and does his best to abide by the rules, particularly in confining himself to giving such facts as are requested by the question and not in volunteering or worrying over the effect of his answers in the lawsuit. It is well to understand that only one side of the case is presented at a time and that interrogation by one counsel or cross examination by another counsel will be cleared up by redirect examination by the first and recross examination by the other until all of the facts have been brought out. It is not necessary to volunteer and to do so is objectionable and will be ruled out by the judge.

If, during the progress of the trial and in the physician's presence, he sees occurrences indicating to him that the attorney for whom he is appearing is omitting an important point or that there is a medical explanation of something that comes out in cross examination, it is preferable that he give a written note of that to the attorney. The attorney may know the situation and may have his reasons for not inquiring further. On the other hand, he may very much want and appreciate a suggestion from the medical side.

It should be understood that every doctor is considered relatively "expert" in the field of medical testimony. He will be entitled to give his opinion, where he has observed facts upon which he can base his opinion. He has had thorough and high quality experience and training, and his license to practice medicine is unlimited. His opinion is expert, as one who has specialized in the subject, specialized training merely adding to the weight that may be given by the judge or jury or the administrative board which is hearing the testimony.

Doctors should understand that a medical witness may be called whether or not he has treated or examined the patient. If he has not treated nor examined the patient, his testimony will usually be limited to his specialty and to expressing an opinion in response to a hypothetical question setting up the basis for the opinion. He should then be absolutely sure that he has taken into account all of the factors stated in the hypothetical question and that those factors include what he needs upon which to base an expert opinion. The attorney, on his part, will take into account the difference between the situation of the doctor who actually treated the patient or who actually examined the patient and the basis of facts upon which he asks the doctor to offer an opinion. This is another situation in which the conference in preparation of the case will be most helpful to both the attorney and the doctor.

Efforts have been made to set down in words the limits of medical testimony and the limits of questions to be propounded to doctors by lawyers. No general rule can be obtained. The lawyer's questions are by the rules of evidence which are enforced by the judge presiding at the trial and limited to eliciting facts and furnishing a foundation of fact from which the doctor, as an expert, can draw conclusions. Those conclusions will be his expert opinion. Therefore, the judge in making the rulings on evidence will limit the attorney. As to the doctor's limits, the safest and most proper rule is that he listen carefully to the question propounded, either upon direct or cross examination, and then answer with what facts he knows which are called for in response to a question. If

he attempts to volunteer or to speculate, immediate motion will be made by an alert attorney to strike, which makes a confusing situation for the doctor, lessens the respect to be accorded to straightforward answers, and may give the jury or judge the impression that the doctor is interested in the outcome rather than a disinterested expert stating facts and conclusions.

It is improper for an attorney to seek to color the professional opinion of the physician. He may properly point out in conference the kind of medical evidence he needs to establish his case and the reasons for it, but he cannot seek to force or shape the doctor's testimony. Neither is it proper or justifiable for the ethical attorney to seek to abuse, badger, or browbeat any witness, including a doctor. The attorney must recognize that the doctor is a practitioner of the art of healing, which is not an exact science. He must also recognize that the physician must often exercise his judgment at once and under high pressure surroundings, particularly in emergencies. He must recognize that there may be two or three courses of action or treatment open to the doctor and that the judgment of the doctor under the circumstances at the time of the treatment may not be identical with the judgment of an expert in the field, who has considered the problem coolly in his office under no pressure for some weeks, with knowledge of all of the facts that may have shown up regarding the patient since that time. If the doctor, as a witness, therefore, gives the facts, bases his opinions and conclusions upon such facts, and answers responsively and disinterestedly to questions propounded, whether they help or hurt the attorney's case, should be shown the utmost in courtesy and in dignified interrogation.

The doctor, on his part, should in the expectation of such fair and dignified treatment, not be hostile or lack candor or frankness in stating facts that he knows or warranted opinions drawn from those facts. His duty is to inform the court and the jury of the facts which are sought by the questions directed to him, not the effect of his answers one way or the other in the suit.

9. *The problem of conflicting medical evidence.* The preceding subdivision has already hinted that where there are one or more methods of diagnoses open to the physician and surgeon, he must exercise judgment under the circumstances at the time and that there is, therefore, a problem of choice. One very common criticism of medical testimony arises from conflicts between the testimony of two or more physicians which may occur with difference of judgment at this point. Doctors themselves are sometimes critical of this situation. This troublesome matter may be partially solved by the observance of several principles, in which each of the professions may cooperate:

a. An attorney can reduce the area of misunderstanding into which conflicting testimony frequently comes by a thorough preparation of his case, careful use of words and terms, and a definite worked out purpose of having certain testimony offered, on all of which he has conferred with the doctor.

b. The doctor can and should explain that medicine is as much an art as it is a science; that, in many situations, alternative diagnosis and treatments are available, any one of which may be appropriate; and that judgment values are not exact but at best fall within rather substantial ranges, with certain risks attending any given problem or procedure; that some cases will not have a successful outcome; that many diagnoses are limited by the subjectivity of the symptoms and are complicated by the mental outlook of patients; and, finally, that diagnosis and treatment must both be evaluated as of the time they

occurred rather than in the light of a later date.

c. The doctor should attempt to make clear to the attorney where an area of conflict may arise and over what facts, diagnoses, or course of treatment, so that they may discuss the situation to the end that questions may be put by the attorney in such form as to enable the doctor to explain the situation.

d. The history of the patient and the particular anatomy and physiology of the area of the body involved should be so discussed between attorney and doctor that an area of understanding of the situation out of which conflicts can arise will be created between them.

10. *Choice of language by medical witness.* The doctor must bear in mind at all times the fact that even administrative bodies, and especially the judge and, finally, the juries in our state, will not be able to understand and follow the medical language. It is possible for medical testimony to be so worded and so technically stated that its meaning is entirely lost upon the jury, or it is so completely misunderstood that the jury interprets facts differently than it would if it understood the true import of the doctor's words.

While the attorney must be vigilant and attempt to secure translation into lay terms, knowing that the doctor can express himself better in the technical terms, the doctor should bear the following in mind: When he uses a term such as femur, he can immediately add "meaning the thigh bone" and point to that part of his body, and so forth. When he names a muscle, he should point to its location and give its common name or function. He should school himself to do so, which will shorten the examination, and he will not be interrupted in order to clarify the matter to the judge and jury, and his testimony will be followed at once and understood.

Again, as in the previous paragraph, it is well for both the attorney and the doctor, prior to the doctor's testimony, to set the stage as it were in plain language, names, and functions, of the general anatomy and physiology of the area of the body to be discussed prior to giving the details of the injury or disease and the diagnosis and treatment. This helps the judge and jury incalculably in understanding the testimony.

Both doctor and attorney should strive to put into intelligible lay language the effect of a particular injury or disease, common names of the parts of the body, and the function that is affected or disturbed, and what the treatment did to such parts and functions. This is usually shorter and easier than the technical statement of the diagnosis or treatment.

The doctor should bear in mind that his testimony is not intended to impress or edify, or even to educate, but to explain. If it does not help to explain and does not clarify the issue in the case, it has failed in the sense that it was not useful to determination of the case for either side.

11. *Interprofessional understanding.* It is the duty of each of our professions and the members to develop an enlightened and proper understanding of the other. Each profession is very essential to the very preservation of society. Their aims are essentially parallel in their services to society and the particular members of society and necessitate a full understanding at all times and full cooperation when that is called for.

It is hoped that the establishment of an interprofessional code will aid in that understanding, particularly by member to member, and that their interprofessional contacts under the guidance of this code may enhance that area of understanding and eliminate the frictions that can

arise when there has been no definition of or realization of the systems under which each must operate in his own sphere.

It is hoped by this joined action that individuals of each profession will seek to eliminate frictions that have arisen, accusations by one member or one profession of the other, and that both our honored professions and our dignified members may progress together in their service to humanity and its individual ills, whether of body, mind, or injuries to rights guaranteed under our legal system.

Both law and medicine are combined arts and sciences; both are inexact, accented by the human limitation of practitioners, but both have the highest ideals and purposes. We should, therefore, understand each other and work together.

PAUL L. JOHNSON, M.D., Liaison officer

Report of Representative to the Governor's State Health Planning Committee

Your representative attended the only 2 meetings of this committee during 1956, on June 8 in Bismarck and September 25 also in Bismarck.

The State Health Planning Committee still devotes practically all of its time to recommendations to the State Health Department regarding disbursement of Hill-Burton and related funds under the categories described under public law 725 and public law 482. There has been some discussion, however, as to the possibilities of efforts in other directions.

During 1956, at the September meeting, 11 requests for funds for various hospital and nurses home and training facilities were presented, and 4 proposals for future consideration. Of these, 5 proposals were granted funds if these projects meet the federal and state requirements. These are as follows:

1. A 30-bed general hospital to replace the existing Deaconess Hospital at Kenmare.
2. A 12-bed addition to the St. Gerard's Community Hospital at Hankinson.
3. A 14-bed addition to the City Hospital at New Rockford.
4. A 160-bed nurses home and training facility to replace the existing unit at the St. Luke's Hospital in Fargo.
5. A 15-bed addition to the St. Vincent's Nursing Home at Bismarck.

It is still the opinion of this committee that most of the efforts in our state should now be toward improving or replacing existing facilities and funds directed toward the establishment of nursing homes and that very few, if any, new hospitals are needed in the state.

As in my 1956 report, I would again urge any communities considering applying for Hill-Burton or related funds to consult very early in their planning with Mr. Arnold O. Goplen, director, Division of Hospitals, North Dakota State Department of Health.

P. H. WOUTAT, M.D., Representative

Report of Representative to the Medical Center Advisory Council

The Medical Center Advisory Council met on June 28, 1956, and January 5, 1957, both of which meetings your representative attended.

Various matters were thoroughly discussed under the following headings:

1. *Admissions to medical school.* For the September 1957 class there were 43 currently acceptable North Dakota students as of January 5, 1957. Good quality students are applying and very few from out of the state are able to gain admission.

2. *Transfers.* There has been no problem in transferring our students to acceptable medical schools in this country and Canada. The dean foresees no difficulty in this regard, at least in the foreseeable future, and reports that our students going to other schools have good records for their third and fourth years.

3. *Biochemistry service.* The Biochemistry Department provides clinical laboratory service for hospitals and physicians throughout the state by doing unusual laboratory procedures which are not available in most hospitals and physicians' offices. Five hundred and eighty-one such procedures were done during 1956 for hospitals and physicians throughout the state. There has been discussion at times as to whether or not fees should be charged for this service. So far, this service load has not been great enough to interfere with the teaching functions of the department. It is the opinion of the Medical Center Advisory Council that no charge should be made for these services at this time. It may well be that in the future the load will increase to the point where fees must be charged, or the services curtailed, as teaching is the prime function of this department and a service load cannot be allowed to get so heavy that it interferes with this function.

4. *Medical student loan bill.* The Advisory Council discussed the various implications of such a bill at great length, and took the position that there is need for substantial loans to needy third and fourth year medical students at a low rate of interest. They were not certain that the Medical Center funds for such loans would be considered as a proper and legal use for these funds, so adopted the following resolution and forwarded it to the proper legislative authorities.

"It has come to our attention that proposals will be made for the use of Medical Center funds for loans to enable medical students to complete their medical education. In the light of previous instructions from the legislature as to the establishment of a four-year school, this Council is reluctant to recommend any action which might appear to be in conflict with the previous legislative directions. However, we do believe that if the Legislature approves, the use of a reasonable amount of Medical Center funds for the purpose of loans to needy medical students might well serve as a stop-gap measure to help provide more physicians for North Dakota Communities."

5. *Discussion of the tuberculosis hospital bill.* This matter was also most thoroughly discussed and the Council took the following position. "Resolved that it is the consensus of this Council that the establishment of a tuberculosis hospital in connection with the Medical Center would be consistent with and a step toward the ultimate establishment of a four-year medical school and the ultimate fulfillment of the purpose of a complete medical center."

6. *Discussion of psychiatry training bill.* This matter was also most thoroughly discussed and the following position taken. "The Medical Center Advisory Council seriously doubts the advisability of using Medical Center funds for the purpose of paying all or any part of the expense of providing psychiatric or other medical services for any other state institution."

7. *Rehabilitation Center.* Construction work on the building for this project is proceeding, and there is hope that it may be ready for occupancy in the late fall of 1957 or early in 1958.

The tentative plans for the operation of this center are, in brief, as follows:

An experienced person will be hired to work out the details of such a program and to coordinate the efforts of numerous institutions, agencies, and groups throughout the state. Such a person is being sought and applicants have been interviewed. A medical director of such a program who is a physician will be needed to direct the actual work of such a program.

Patients will only be accepted at the referral of physicians and proper agencies throughout the state, and a fee would be charged for those who are able to pay or who are under programs such as vocational rehabilitation, which have funds to buy such services. Only ambulatory patients could be accepted, as no bed facilities will be available in the Rehabilitation Center. Bed patients could be accepted only if arrangements were made with the local hospitals and physicians.

It is the intent that the Rehabilitation Center work in cooperation with other agencies in the state and with the physicians and not to supplant their services.

On April 3, 1956, a meeting was held at the Medical Center at which there were representatives from many agencies throughout the state interested in health matters. About 20 people were present at this meeting, including your representative. It became obvious during the discussions that much educational work will be necessary and much other preliminary work must be done before such a program can be instituted.

The advisory council has been thoroughly informed regarding the necessity of securing physician cooperation if such a project is to be successful and has suggested that an advisory committee from the state medical association be requested.

I would recommend that if a request is made for such a committee from the state medical association that such a committee be appointed.

8. *Student Health Services.* It is the intent to operate the Student Health Service from the Rehabilitation and Treatment Center Building as an outpatient service, no infirmary beds being planned. Such could be added on another floor but would have to be done at the expense and on the responsibility of the University. Students needing infirmary or hospital care are currently being treated in the local hospitals, and it appears to your representative that this is a satisfactory arrangement and much more economical than would be the operation of an adequate infirmary. The University people point out to us, however, that many students are sent back to their dormitories or rooms with mild illnesses which would be treated in an infirmary if such were available.

P. H. WOUTAT, M.D., Representative

Report of the Delegate to the American Medical Association

Your delegate attended all meetings of the annual and interim sessions held in 1956. The alternate delegate attended the clinical session in Seattle. Your delegate continues to serve as a member of the Council on Rural Health and as chairman of the Committee on Medical and Related Facilities.

A complete report of the transactions of the House of Delegates appears in the J.A.M.A., covering both the annual session at Chicago and the clinical session in Seattle. The following is a brief summary of some of the actions taken by the House.

At the June 1955 session, a resolution was adopted calling for the appointment of a committee to review the functions of the Joint Commission on Accreditation of Hospitals. This committee was formed and its chairman,

Dr. Wendell C. Stover of Indiana, reported at the June 1956 meeting. This is a lengthy report and it has since been published as a pamphlet which is available to anyone interested in reading the complete report. The committee recommended that:

Accreditation of hospitals should be continued with its present organizational structure.

Physicians should be on the administrative boards of hospitals.

General practice sections in hospitals should be encouraged.

Staff meetings as required are satisfactory, but attendance requirements should be set up locally.

The Joint Commission should not be a punitive organization.

Hospital surveyors should be directly employed and supervised by the Joint Commission.

Considerable educational work needs to be done to explain the functions of the commission.

The committee further recommends that the commission should study the problem of the exclusion from hospitals and arbitrary limitation of the hospital privileges of general practitioners and recommended that, "The privileges of each member of the medical staff shall be determined on the basis of professional qualifications and demonstrated ability."

In general, the committee found that much of the difficulties arising in dealing with the Joint Commission on Accreditation arose from lack of understanding of the commission's functions and powers.

The House approved in principle the proposals worked out mainly by the Federation of State Boards for evaluation of the ability and training of foreign trained physicians.

A major action by the House involved the problem of private practice by medical school faculty members. The House adopted a Council on Medical Service report prepared by the Committee on Medical and Related Facilities of the council which stated: "It shall be the policy of the American Medical School Association that funds received from private practice of medicine by salaried members of the clinical faculty of the medical school or hospital should not accrue to the general budget of the institution and that the initial disposition of fees for medical services from paying patients should be under the direct control of the doctor or doctors rendering the service." It was also recommended that adequate liaison be developed and maintained between each county medical society and any medical school or schools in its area; and that publicity emanating from a medical school should be in good taste and of a type which has the approval of the general medical community in that area. The adopted report also made a general statement which would be applicable to any situation where a physician is engaged in activities other than strictly private practice. This principle states, "It is not in the public or professional interest for a third party to derive a profit from payment received for medical services, nor is it in the public or professional interest for a third party to intervene in the physician-patient relationship."

The matter of federal aid to medical schools was also under discussion and the general A.M.A. policy is that federal aid would be acceptable provided it is confined to a single grant for building purposes.

A resolution was adopted asking for some control of premature publicity on new drugs.

The House of Delegates continues to oppose the inclusion of physicians in social security.

A proposed revision of the Principles of Medical Ethics was presented at the June 1956 session for consideration and study. The new proposed code of medical ethics reads as follows:

1. The prime objective of the medical profession is to render service to humanity with full respect for both the dignity of man and the rights of patients. Physicians must merit the confidence of those entrusted to their care, rendering to each a full measure of service and devotion.

2. Physicians should strive to improve medical knowledge and skill and should make available the benefits of their professional attainments.

3. A physician should not base his practice on an exclusive dogma or a sectarian system nor should he associate voluntarily with those who indulge in such practices.

4. The medical profession must be safeguarded against members deficient in moral character and professional competence. Physicians should observe all laws, uphold the dignity and honor of the profession, and accept its self-imposed disciplines. They should expose, without hesitation, illegal or unethical conduct of fellow members of the profession.

5. Except in emergencies, a physician may choose whom he will serve. Having undertaken the care of a patient, the physician may not neglect him. Unless he has been discharged, he may discontinue his services only after having given adequate notice. He should not solicit patients.

6. A physician should not dispose of his services under terms or conditions which will interfere with or impair the free and complete exercise of his independent medical judgment and skill or cause deterioration of the quality of medical care.

7. In the practice of medicine, a physician should limit the source of his professional income to medical services actually rendered by him to his patient.

8. A physician should seek consultation in doubtful or difficult cases, upon request, or when it appears that the quality of medical service may be enhanced thereby.

9. Confidences entrusted to physicians or deficiencies observed in the disposition or character of patients, during the course of medical attendance, should not be revealed except as required by law or unless it becomes necessary in order to protect the health and welfare of the individual or the community.

10. The responsibilities of the physician extend not only to the individual but also to society and demand his cooperation and participation in activities which have as their objective the improvement of the health and welfare of the individual and the community.

These proposed changes were considered in detail at the November session and the report adopted by the House included the following statements:

"The preamble and seven of the ten sections appeared to be acceptable in their present form. Sections 6 and 7 were not acceptable as presented either to the group which appeared at the hearing or to the reference committee. It appears that at least 4 areas needed more specific attention in sections 6 and 7. These are: (1) division of fees, (2) the dispensing of drugs and appliances, (3) the corporate practice of medicine, and (4) greater emphasis concerning the relationship between physicians and patients."

The entire proposed principles of medical ethics were referred back to the Council on Constitution and By-laws for further study and will be again presented as revised at the coming New York session. It is anticipated that at least six weeks prior to this session, the new proposals

will be published in the Journal for all those interested to study.

The policy on veteran's medical care was revised in November to read as follows: "With respect to the provision of medical care and hospitalization benefits for veterans in veteran's administration and other federal hospitals that new legislation be enacted limiting such care to veterans with peace time or war time service whose disabilities or diseases are service incurred or aggravated." In another action concerning veterans, the House passed 2 resolutions condemning as unlawful the practice of veteran's administration hospitals which admit patients who are covered by Workmen's Compensation insurance or by private health insurance and which render bills for the cost of their care.

The House of Delegates rejected a resolution which recommended the discontinuance of the clinical sessions.

A resolution was passed urging hospital administrators and hospital staffs to admit alcoholics as general hospital patients.

The House directed the Board of Trustees to continue its investigation of the possibility of developing a statement of A.M.A. policies and arrange for the periodic publication of up-to-date versions of such policies. This has been done and a number of pamphlets have been published outlining the policy of the A.M.A. in certain fields.

The House passed a resolution calling for the American Medical Association to join with the American Hospital Association and the American Institute of Architects in their proposed study of hospital design and construction, which is being financed by a grant from the Public Health Service.

The House of Delegates, in recent years, has shown a real desire and ability to face many of the perplexing problems confronting organized medicine today. Throughout the year, the councils, committees and, the Board of Trustees of the association have been actively engaged in gathering information, and, so far as possible, trying to carry out policies outlined by the House of Delegates. The major difficulties confronting medicine today are concerned, as they have been for many years in the past, with the intrusions and attempted intrusions in the field of the private practice of medicine. This, as has been pointed out by your delegate in previous reports, comes from legislative bodies, social planners, hospitals, labor unions, and innumerable other people and organizations who all feel that they know better how medical service should be delivered to the people than do those engaged in delivering this service, the doctors. In order that such challenges may be properly met, it is essential that the profession be well organized, well informed, and give its active support to its own association.

Your delegate wishes to express his appreciation for the privilege of serving you in the past year and would again recommend that the alternate delegate be sent to both sessions.

W. A. WRIGHT, M.D., Delegate

NEW BUSINESS

Speaker Dodds next introduced Dr. W. O. Johnson, who spoke as follows:

"I was at a legislative meeting of the North Central States in Minneapolis on May 2. There were certain things they felt would be pertinent information for all the states to consider on a legislative basis. As most of you know, legislation is getting to be quite a thing

as far as the medical profession is concerned. There were 574 bills directly affecting medicine introduced at this last session; fortunately less than one-half were passed. In the eighty-fifth Congress, the present one, in the first four months there have been 357 medical bills introduced as of this date. It is interesting to go into this since the original bill was thrown into the hopper.

"Most of you know about the situation in Iowa—that they were having their hands full because of the difficulty between the medical association and the hospital association. The hospital association was ruled against but only on condition that the two associations get together and iron out their differences. It cost the medical association approximately \$60,000 last year to fight that bill. Their legislative budget for 1957 is \$12,000 and to give you an idea how it has grown in Iowa, in 1949, the legislative budget was \$3,600. I do not want to start any explosions here, but I think you should know that the state of Iowa association has \$85 dues, \$35 additional dues, and \$25 additional A.M.A. dues to raise this money for legislative processes. I think these points should be brought to your attention.

"We states in the North Central area should do as South Dakota has done. They bring in a man or two men to the legislative session from any place in the state to attend the sessions from one to two days. They come in voluntarily and pay their own way—not as legislative committeemen. I think we might learn a lesson from South Dakota in that I do not think enough doctors here know what it means to appear before a legislative committee.

"I believe also that North Dakota should tie their legislative program to the national basis. It might be well to watch the progress that is taking place on a national basis. It could be done by key personnel in the state set up by the House of Delegates. The key man could send certain people a list of every bill that is posted in Congress on each day. That would keep you posted as to what is up in Congress each day. There should be more coordination of the legislative committee on legislative affairs in Bismarck.

"We are also forgetting, I believe, the help we could get from our Women's Auxiliary. We are underestimating the power that women have on state legislatures. They are becoming very active on a national basis. Carbon copies of all legislative material which comes up could be sent to the regional chairman of the Women's Auxiliary. Mrs. Stephen Bacheller of Enderlin, North Dakota, is regional chairman for the northern states and she in turn could send the material to each state president of each state's Women's Auxiliary.

"The group in Minneapolis was very impressed with our legislative program in North Dakota. However, one of the things in which I think we have failed is in utilizing the liaison committee set up in the medical association in order to further our points in many respects. The best indication is that had we contacted the hospital association regarding the Medical Practice Act we could have avoided some trouble on the floor. Iowa sends two representatives of the medical association to Washington, D. C., each year to contact all their representation in Washington. I do not believe this is necessary, but they feel they are getting better results by discussing the bills on the ground floor of the legislator than when he is at home.

"Doctor Coleman is the regional chairman of this area, and he asked me if he could receive an invitation from this body to appear before the House of Delegates in

1958. I think he could give you a better picture of what is necessary on legislative procedures. In this last session, we watched 29 bills regarding medical matters, and we much continue to watch these if we are to keep in step as far as legislation is concerned.

"The chairman of the Legislative Committee should be appointed for more than one year. In fact, a three-year term of office for your legislative chairman would be advisable and also an assistant chairman should be appointed to work with him. Then, when the chairman retires, the assistant could step up into his position and in that way he will know how to handle this work. There should also be a very definite budget set up for your legislative chairman and the committee. I think you should set up a budget so that he knows where he is and what he can spend, and, in this way, the people representing you in the legislative circles can do so more freely than they would if they were paying for this expense out of their own pockets. I do not believe you want someone else to pay for your legislative expenses.

"I would be happy to answer any questions you may have and I would be interested in having you consider this program and give it pretty serious thought. This is an interesting thought—these are matters that are in the headlines every year—that the average hospital bill has jumped over 100 per cent in eight years. People sometimes do not know the difference between a doctor bill and a hospital bill. The average patient's bill in the nation jumped from \$88.72 in 1947 to \$180.87 in 1955. When you really look into this, the average hospital bill of \$180.87 in 1955 is not very awesome with the average family yearly income of \$5,000. But that is not the true picture. A study compiled shows that in the year 1955, 107,000,000 people had some sort of hospital insurance. At the same time, 91,000,000 had surgical coverage and 51,000,000 had coverage for medical expense. The president is always calling to the attention of the public the fact that we are becoming a luxury. The politicians are going to improve that impression if they can because they want the vote of the little man.

"I trust you will consider this item. The American Association of Physicians and Surgeons are conducting an essay contest. North Dakota has never taken any specific steps regarding this. I would like to see this body take an active step, whether they are or are not going to support this thing."

Mr. Limond, executive secretary, asked if it were not true that the American Association of Physicians and Surgeons feel that, regarding Dr. Johnson's last statement, this would have to be on a district society level basis. Dr. Johnson responded that this would mean that it would be necessary to set up a committee from each society to evaluate the essay in this contest. Mr. Limond then asked if Dr. Johnson were suggesting that the House of Delegates suggest to the district medical societies that they become interested in this essay contest. Dr. Johnson responded in the affirmative and stated that he believed the Woman's Auxiliary would be glad to handle this project.

Speaker Dodds next addressed the House of Delegates as follows: "I can see three things: one, a longer tenure of office for the chairman of the Legislative Committee, together with an assistant chairman appointed by the president; two, the recommendation that the council set up a budget for the chairman of the Legislation Committee; three, that you would like to have a resolution approved by the House of Delegates to the effect that the Woman's Medical Auxiliary go into this essay

contest and spearhead this drive. Is there anything else?"

Dr. O. W. Johnson asked that an invitation be extended to Dr. Coleman to appear before the House of Delegates in 1958. Dr. Dodds replied that the matter would be taken care of and requested Dr. Pederson, as chairman of the Committee on Resolutions and New Business, to have that committee present a resolution for consideration by the House of Delegates, relative to Dr. Johnson's talk, at the session the following day. There should be a resolution relative to the Woman's Auxiliary spearheading the essay contest and a motion for presentation to the House on their action for increasing the length of term of the chairman of the Legislative Committee, together with the appointment of an assistant chairman on this committee and also one to the council for setting up a budget for the Legislative Committee.

The Committee on Legislation had a budget in 1956 of \$1,500, and the same amount was requested in 1957. It was noted that the Legislative Committee ran \$6.97 over their budget.

Speaker Dodds felt it would be a wonderful opportunity for the House of Delegates to have Dr. Frank Coleman address the 1958 session and asked that a motion extending such an invitation be made. Dr. Pederson made the motion, which was seconded by Dr. Wold. Motion was passed. The secretary was instructed to contact Dr. Coleman with such an invitation.

Dr. R. H. Waldschmidt, president of the association, was next presented to the members of the House of Delegates by Dr. Dodds, and spoke as follows:

REPORT OF THE PRESIDENT

I want to compliment the Prepayment Committee, the Economics Committee, the Legislative Committee and the House of Delegates for their diligent work this past year. We had quite a few meetings forming this Medicare Program and there was full representation at every meeting.

I believe there are two things in which the state medical association should become interested; one, the safety program on our highways. I believe a rather active committee on this subject should be set up. Two, our emergency medical service in case of a national disaster. We have a radar base and interceptor base at Minot and at Grand Forks. If we have an invasion, we are going to have some trouble. At Fargo is a very vital meat plant. At Bismarck, we have a couple of vital bridges and, if the four-lane highway goes through, these are all very important spots, and some nest eggs dropped might be on them. Also, there is the Mandan Refinery. All of these will be very important problems in case of an invasion.

In the Handbook, I recommended that something which is up to the House of Delegates is the American Medical Association Educational Foundation. I have made a suggestion that we take \$5.00 or \$10.00 of our dues and earmark it for the Foundation, and you can designate where you want it to go. I urge that the men who have given will continue to do so and that we can say at least next year that we will have given \$10,000. We do have a small membership, and \$5,000 is quite a thing, but I think we will all have to admit we did not have to pay for all of our medical education, and I think this is one way we can forestall what Congress is planning to do to make us a socialistic nation.

I want to make another plea. I find that our delegates and councillors do not go back and report to our district societies what is done at these annual meetings. Let me urge you to go back and explain to them at your first

meeting of the society what is taking place at these meetings.

Sometime ago we got a letter from Wisconsin requesting that the North Dakota State Medical Association support Doctor Gunderson for president-elect of the American Medical Association. I think our delegate to the A.M.A. should be instructed of our wishes in this matter. When the Medicare Program was brought up in St. Paul, the state medical society of Wisconsin came to that meeting with 2 attorneys, 3 or 4 doctors, and probably 1 of the best executive secretaries in the entire United States. You can see that they have a powerful organization.

I think we should follow their request, as we have asked them to be our fiscal agent in this Medicare Program. I understand Doctor Gunderson, himself, has worked very faithfully toward this program.

R. H. WALDSCHMIDT, President

Speaker Dodds instructed Dr. Fox, chairman of the Reference Committee, to consider the report of the president, to pay particular attention to Dr. Waldschmidt's recommendations and to make his recommendations at the next session of the House of Delegates to be held the next day. Dr. Pederson, as chairman of the Committee on Resolutions, was instructed to also report the following day on the matter of the resolution from the House of Delegates relative to Dr. Gunderson as an instruction to our delegate to the A.M.A.

Dr. C. J. Glaspel, secretary of the State Board of Medical Examiners, was next introduced to the members of the House of Delegates, and gave them his annual report on the Board of Medical Examiners. Dr. Glaspel was congratulated by the speaker and the delegates for his election this year as president of the Federation of the State Medical Boards of the United States.

The Nominating Committee, as appointed by the president, is as follows: Dr. C. H. Peters, chairman; Dr. R. D. Nierling, and Dr. V. G. Borland. The Nominating Committee was instructed to report at the second session of the House of Delegates to be held on the following day.

Dr. Boerth next presented a resolution, received from the Louisiana State Medical Society, which they requested action be taken on.

RESOLUTION

Whereas, television and radio are repeatedly expounding the cause of patent medicine firms and their products over the TV and radio stations and recommending these respective drugs to the public as cure-alls, thereby creating false claims and hopes for the general public, and

Whereas, these misrepresentations cause an irreparable harm to the general population in their misguided usage of such drugs recommended, and

Whereas, each individual is unto himself a distinct and separate problem, subject to susceptibilities and idiosyncrasies, often-times making these drugs contraindicated,

Now, therefore, be it resolved that the House of Delegates recommend that our delegates to the A.M.A. House of Delegates exert every effort to have the A.M.A. House of Delegates give this matter serious consideration and obtain some relief from such dangerous advertising, and

Be it further resolved that a copy of this resolution be sent to all other state societies requesting their support in passing such a resolution, thereby securing some relief from such harmful practices.

The following resolution was received from the Colorado State Medical Society with the request that action be taken at this annual meeting.

RESOLUTION

Whereas, the time-honored right of the American citizen freely to choose his physician from among all those available and legally qualified has contributed immeasurably to the advancement of American standards of medical care to their present world pre-eminence, and

Whereas, deterioration in the quality of medical care rendered has developed in systems of medical care which deny patients this traditional American right, and

Whereas, the definition of the free choice of physician in the Principles of Medical Ethics of the A.M.A. recognizes the validity of interest of a third party interjected between the patient and his choice of physician only when that third party assumes legal and financial responsibility for occupational disease or injury, and

Whereas, this House of Delegates reiterated its adherence to this free choice principle as a fundamental right of American citizens which contributes to the betterment of medical care by unanimously adopting Resolution No. 24 at the June 1956 Chicago Session, thereby directing the Councils on Medical Service and Industrial Health to revise their published "Guiding Principles for Evaluating Management and Union Health Centers" to conform to the free choice principle,

Now, therefore, be it resolved that this House of Delegates again reiterates the adherence of the A.M.A. to the principle of the free choice of physician as currently defined in the Principles of Medical Ethics as being essential to the welfare of the patient, and

Be it further resolved that the Judicial Council is requested to caution all members of the American Medical Association that voluntary participation in systems of medical care which deny patients their right of free choice of physician as so defined, other than as may be required by the mandates of law, constitutes a violation of the Principles of Medical Ethics.

Action was also requested on a brief questionnaire regarding tuberculosis and thoracic hospitals, which was sent to the association by the Tennessee State Medical Association, asking that it be answered and returned to them. This was referred to the House of Delegates by the council.

Speaker Dodds stated that at the meeting of the council, held earlier on this day, Dr. Waldschmidt made a proposal regarding representation from the state medical association to the board of directors of Blue Shield. A resolution was approved by the council stating that the chairman of the council, the second vice-president, and the speaker of the House of Delegates should be appointed as members-at-large to serve on the board of directors of the Blue Shield. Dr. Borland was to present this resolution to the Blue Shield meeting the following morning. The council asked that the House of Delegates pass a resolution to this effect. Dr. DeCesare stated that various angles of this proposal should be considered. Most all of the members that serve as directors of the Blue Shield are representatives of their district societies, and some of them are councillors and some are delegates, and it was believed that there is proper representation from the state medical association.

Dr. Waldschmidt made the point that doctors do have representation but that the state medical association is not represented. The state medical association should have a voice in what is going on in Blue Shield. It is true that the members who are on the board of Blue Shield represent the district societies, but they do not represent the state medical association. Dr. DeCesare responded that there was one point he wished to bring up—that Blue Shield is a service organization and the North Dakota State Medical Association represents a body of professional physicians. He stated that these should be parallel, but there should not be a marriage between the two. If you get official representation in this matter, sometimes action cannot be taken until the three representatives from the medical association go back to their association members to find out what action should be taken. Dr. R. W. Rodgers commented that he believed this does offer quite a few problems, but that he felt that the Blue Shield should be more completely identified with the state medical association. Many doctors look upon this as just another medical insurance plan, but it is our plan and it should be

identified with the state medical association. In those states in which it is closely identified with the doctors of the medical association, they have a much better working arrangement.

Speaker Dodds reminded the House of Delegates that it should be borne in mind that the action they will take is up to Blue Shield. They might not appoint these doctors to the board of directors.

Dr. Waldschmidt brought up another point which was that the association has an executive committee of the council and that their action binds the council. He suggested that when these three members act, their action should bind the association. There should be no delay in any problems that come up, and their actions and decisions should be binding on the state medical association.

Speaker Dodds asked for a motion from the floor for approving or disapproving this resolution and Dr. Boynton moved that the resolution be adopted favoring the proposal of Dr. Waldschmidt concerning appointment of three members of the state medical association to the board of directors of the Blue Shield; namely, the second vice-president, the speaker of the House of Delegates, and the chairman of the council. Motion was seconded by Dr. Jaehning. Dr. J. C. Fawcett stated that there might be an objection to this by making the board of directors of Blue Shield more cumbersome and that, perhaps, these members should be ex-officio. Speaker Dodds explained that this was discussed by the council at their meeting held earlier in the day and it was decided that they would not want ex-officio members as they then would have no vote. Drs. DeCesare and Leigh explained the working of the Blue Shield briefly to the members of the House of Delegates. Dr. Boynton added that he felt Blue Shield is our protection against socialized medicine and that the association organized it and should do everything in their power to try to get it working smoothly. Dr. Dodds stated that if this resolution should be adopted and if Blue Shield approves the action, a motion would be in order to make that action binding on the association. There being no further discussion, a vote was taken on the resolution that was proposed. Motion was passed.

Dr. Fox next presented a resolution from the Devils Lake District Medical Society and asked that the House of Delegates take action on this.

RESOLUTION

Whereas, the directive of the Public Welfare Board of North Dakota of December 20, 1956, specifically relative to the expansion of the scope of the North Dakota Crippled Children Services to include numerous medical conditions previously excluded, which can and have been adequately handled by the general practitioners of the state up to this time, and

Whereas, this addition would indicate further encroachment of socialized medicine on the private practice of medicine, and

Whereas, the members of the Devils Lake District Medical Society are unanimous in their feeling that the Crippled Children's program is inequitable in its discrimination against the general practitioner,

Now, therefore, be it resolved that the Devils Lake District Medical Society respectfully requests of the House of Delegates that a critical review of the conditions treated under the Crippled Children's program be undertaken; that conditions which can be cared for by the general practitioner be removed from the Crippled Children's program; and that new cases be admitted to the Crippled Children's program only on the written referral of their family physician.

The chair referred the above resolution to Dr. Pederson, chairman of the Committee on Resolutions and New Business.

The chairman of each Reference Committee was asked to advise where the committee would meet and the time of meeting.

ADJOURNMENT

There being no further new business to come before the House, it was moved and seconded that the first session of the House of Delegates adjourn to reconvene at 2:00 P.M., Sunday, May 26, 1957. Time of adjournment was 6:00 P.M.

PROCEEDINGS OF THE HOUSE OF DELEGATES

of the North Dakota State Medical Association

Seventieth Annual Meeting, Second Session

Fargo, North Dakota, May 26, 1957

The second session of the House of Delegates was called to order by speaker Dodds at 2:00 P.M., May 26, 1957 at the Gardner Hotel, Fargo. Dr. M. S. Jacobson, Credentials Committee, reported that there was a quorum present, and the secretary, Dr. E. H. Boerth, called the roll. The following doctors responded:

David Jaehning, Wahpeton; L. E. Wold, Fargo; F. A. De Cesare, Fargo; F. M. Melton, Fargo; J. S. Gillam, Fargo; W. R. Fox, Rugby; R. M. Fawcett, Devils Lake; Robert Painter, Grand Forks; Bruce Boynton, Grafton; W. C. Dailey, Grand Forks; R. E. Mahowald, alternate, Grand Forks; A. F. Hammargren, Harvey; G. Christianson, Valley City; Carl Baumgartner, Bismarck; M. S. Jacobson, Elgin; R. W. Henderson, Bismarck; R. B. Tudor, Bismarck; M. E. Nugent, Bismarck; T. E. Pederson, Jamestown; John Elsworth, alternate, Jamestown; Dean Strinden, alternate, Williston; R. F. Gilliland, Dickinson; Robert McLean, Hillsboro. Twenty-three delegates answered the roll call.

The following also attended the meeting: Drs. R. H. Waldschmidt, Keith Vanderson, J. C. Fawcett, R. B. Radl, C. H. Peters, O. A. Sedlak, C. J. Glaspel, W. A. Wright, P. H. Woutat, W. H. Gilsdorf, G. W. Toomey, E. J. Larson, V. G. Borland, and Mr. Lyle A. Limond.

The first order of business was a motion to dispense with the reading of the minutes of the first session, which was seconded and passed.

REPORTS OF REFERENCE COMMITTEES

Reference Committee to Consider the Reports of the President, Secretary, Executive Secretary, and Treasurer

Dr. W. R. Fox, chairman, presented the following reports and their discussions, which were adopted section by section and as a whole:

1. *Report of the President.* The committee concurs with the president in his commendation of the Legislative Committee, Committee on Prepayment Medical Care, and the Committee on Medical Economics for their great efforts and splendid achievements. We note with interest the president's comments to the effect that the quality of nursing care of acute and chronically ill is on the downgrade. We recommend that the Committee on Nursing Education give their immediate attention to this problem.

The President points out that the North Dakota Legislature has kept faith with the medical students by providing a loan fund to enable a student to complete his third and fourth years.

We concur with the president that we must be continually alert to the insidious but constantly progressive penetration by federal and state government into the shrinking realm of private medicine. The trend must be stopped.

We agree with Doctor Waldschmidt that it is a privilege and a duty to make an annual contribution in support of medical schools of the country. The committee feels that earmarking of a portion of the annual dues for this purpose is not in the best interest of the state association. However, we urge that increased efforts be made in the district societies to obtain more general participation on an individual basis for this worthwhile cause.

The president points out that some committees may have overlapping functions. We suggest that the incoming president delegate one of the present committees to study the feasibility of combining some of the various committees.

The president was timely in calling our attention to the possibility of a major catastrophe in our area, and we concur in his desire to have a statewide disaster plan drawn up.

The committee also concurs with the president that the physicians of North Dakota should participate more actively in the Highway Safety Program.

We are deeply appreciative of the time and effort which president Waldschmidt has devoted to his job, and he is deserving of the commendation of the state medical association for the excellent job he has performed.

This portion of the report was adopted.

2. *Report of the Secretary.* The reference committee reviewed the report of the secretary, which notes that dues should be forwarded to the state office not later than March 1 of the current year. We wish to call the attention of the House of Delegates to the report which shows only 328 paid-up members of a total of 380. We urge each district to increase their efforts to submit the dues promptly.

This portion of the report was adopted.

3. *Report of the Executive Secretary.* "The reference committee wishes to commend the executive secretary on his continued personal contacts with the individual physicians and related professions. Particularly, we commend him for diligent and untiring effort during the legislative assembly. We are pleased to note that 5 new physicians have been placed in the state through the efforts of the executive secretary's office. It is heartening to find that our goal of a year's operating budget in reserve has been reached, and we feel that this should be maintained. We find the executive secretary has expended considerable effort on his "thoughts for the future," and commend these to the incoming president.

We favor passage of the Jenkins-Keogh bill as recommended by the president and executive secretary.

This portion of the report was adopted.

4. *Report of the Treasurer.* The reference committee carefully studied the report of the treasurer and commends Dr. E. J. Larson for his devotion and meticulous attention to his duty.

This portion of the report was adopted.

The motion was made by Dr. Fox and seconded by Dr. Nugent that the report be adopted as a whole. Motion carried.

W. R. Fox, M.D., chairman
FRED ERENFELD, M.D.
DAVID JAEHNING, M.D.
M. E. NUGENT, M.D.
DEAN STRINDEN, M.D.

Reference Committee to Consider the Reports of the Council, Councillors, and Special Committees

Dr. Boynton, chairman, presented the following reports and their discussions, which were adopted section by section and as a whole:

1. *Report of the Chairman of the Council.* Your reference committee reviewed the report of the chairman of the council. I was asked by members of the reference committee to read this paragraph of this report: "A motion was carried to charge \$5.00 per person for the Sunday night mixer at the annual meetings of our association. This action was taken in defense of those who did not wish to attend the mixers." This charge is being assessed against doctors and their wives and not against detail men. If the council intended that everyone should be charged \$5.00, we would like to have this changed. I would like this thrown open for discussion.

Speaker Dodds explained that the reason detail men

were not charged was because it was felt that when these men paid for the exhibit space, they should not be charged for the mixer. Mr. Limond was called upon to give the figures for the cost of the mixer and to explain further about the exemption of the detail men from payment for admission to the mixer.

Dr. Boynton stated that the reference committee would like the wording in the paragraph of the report of the chairman of the council, referring to the mixer, changed to read so that it states that the exhibitors are guests of the doctors of the association attending the Sunday night mixer.

Speaker Dodds called for a motion on this which was made, seconded, and passed. Therefore, in the future, the exhibitors will be guests at the Sunday night mixer. The chair instructed Mr. Limond to see that all exhibitors were invited.

Dr. DeCesare made the motion that the state medical association sponsor a mixer at each annual meeting, inviting as guests the detail men and guest speakers, and if there is not a fund for this, it could perhaps be financed by a registration fee. Motion was seconded by Dr. Erenfeld and passed by a majority, with 2 delegates opposing.

This portion of the report was adopted.

2. *Reports of the Councillors.* The reference committee reviewed the reports of the councillors, and the committee does not feel that all their reports are adequate. To prevent further repetition of these deficiencies, the committee requests that the office of executive secretary prepare a standard form for the preparation of annual reports for the councillors. This form should include as a minimum the names of officers, the dates, speakers, and subjects for district meetings and the new, transferred, and deceased members. We feel the executive secretary should notify the councillors of the required standards of these reports prior to their submission.

This portion of the report was adopted.

3. *Report of the Committee on Geriatrics and Rehabilitation.* The reference committee reviewed the report of this committee and asked that this portion of the report be adopted.

This portion of the report was adopted.

4. *Report of the Committee on Foreign Trained Physicians.* The reference committee reviewed the report of the committee.

This portion of the report was adopted.

5. *Report of the Committee on Emergency Medical Service.* The reference committee reviewed the report of this committee.

This portion of the report was adopted.

6. *Report of the Committee on American Medical Education Foundation.* The reference committee reviewed the report of the committee.

This portion of the report was adopted.

7. *Report of the Committee on Constitution and By-Laws.* The reference committee reviewed the report of this committee and at the request of the chairman, Dr. R. B. Radl, wished to report additional requested revisions of the Constitution and By-Laws as follows, these revisions to be included as part of his report. This is to add to the present suggested revision of the constitution: "The term of the Councillor-at-Large shall not be included in the limit of the two consecutive terms referred to above."

The chair next called upon Dr. Radl, chairman of the Committee on Constitution and By-Laws for discussion and explanation. Dr. Radl spoke as follows:

"I understand that yesterday the House of Delegates accepted the revision as printed in THE JOURNAL-LANCET of October 1956. Actually, if we accept this today, the revision is changed again. What you accepted yesterday in the constitution was as follows:

The President, president-elect, vice-presidents, secretary, and treasurer shall be elected annually by the House of Delegates to serve for a term of one year. The councillors shall be elected by the House of Delegates annually to serve for a term of three years, but a councillor shall not serve more than three terms.

"This revision is as follows:

The President, president-elect, vice-presidents, secretary, and treasurer shall be elected annually by the House of Delegates to serve for a term of one year. The councillors shall be elected by the House of Delegates annually to serve for a term of three years; the limit of consecutive terms shall be two. In instances where councillors are elected to fill the unexpired terms of previous councillors, the portion of the unexpired term shall not be included in the limit of the two consecutive terms referred to above. The term of the Councillor-at-Large shall not be included in the limit of the two consecutive terms referred to above.

"I would like to suggest that this be reprinted now, as we have so many books to refer to now on our Constitution and By-Laws."

Speaker Dodds called for a discussion on the motion of adopting the change in the constitution. This change would have to be approved at this time, and lay over for one year for ultimate approval. Since all members of the House of Delegates were in favor of the change in the constitution, the motion carried.

Dr. Boynton gave further details concerning the changes in the Constitution and By-Laws as follows:

"In the By-Laws, Doctor Radl's committee has requested this addition: This sentence precedes the last sentence in Chapter VII, the Council, Section 1:

A councillor who fails to attend meetings of the council and whose absence in the opinion of the council is without good cause shall be replaced.

"The suggested change in the By-Laws, Chapter II, Section 1, now reads as follows:

The annual session shall be held for four consecutive days beginning on a Saturday, which period of time shall include the first Sunday in May.

"Since it is not always possible to schedule a meeting at that time, the suggested change is as follows: Chapter II, Annual and Special Sessions of the Association, Section 1.

The annual session shall be held for four consecutive days beginning on a Saturday which period of time should include the first Sunday in May.

"Another suggested change is in regard to committees and is as follows: Chapter 8, Committees, Section 2.

Standing committees of the North Dakota State Medical Association shall be:

1. Committee on Scientific Program.
2. Committee on Medical Education
3. Committee on Necrology and Medical History
4. Committee on Public Health
5. Committee on Nursing Education
6. Committee on Maternal and Child Welfare
7. Committee on Crippled Children
8. Committee on Public Relations
9. Committee on Legislation
10. Committee on Official Publication
11. Committee on Medical Economics
12. Committee on Veterans Medical Service
13. Committee on Prepayment Medical Care
14. Committee on Rural Health
15. Committee on Cancer
16. Committee on Diabetes
17. Committee on Mental Health.

Section 3. Special committees may be appointed annually by the president. It is suggested that the president consider annually the formation of special committees as necessary:

1. Committee on Geriatrics and Rehabilitation.
2. Committee on Emergency Medical Service.
3. Committee on American Medical Education Foundation.
4. Liaison Committee to the North Dakota Hospital Association.
5. Liaison Committee to the North Dakota State Pharmaceutical Association.
6. Liaison Committee to the State Bar Association.

7. Advisory Committee to Public Assistance Division of Public Welfare Board.

8. Committee on School Health.

9. Nominating Committee."

This portion of the report was adopted. Speaker Dodds again called on Dr. Radl to discuss the change in the By-Laws. Dr. Radl: "The suggestion made to the committee yesterday was a little more in detail. Actually, the technique of replacing such a person is already taken care of in the By-Laws. I think this sentence covers the field regarding replacement of a Councillor."

Dr. Nierling asked Dr. Radl how many meetings a councillor could miss before he would be replaced. Dr. Radl stated that the council should make its own decision on this point. It is easy to tell what a good attendance is because that depends on the needs of the meetings. Last year, there were additional problems and next year it may be necessary to have 2 or 5 meetings, depending upon the needs.

This change in the By-Laws was adopted.

Dr. Boynton moved that the executive secretary be instructed to prepare and have printed a new Constitution and By-Laws to include the changes in the constitution as approved at this session, on the assumption that these changes will be approved and passed at the 1958 session. It was felt that the changes in the Constitution and By-Laws are extremely hard to follow from so many sources, and an up-to-date revision would be most helpful in printed form. Motion was seconded by Dr. Gilliland and passed.

8. *Report of the Committee on School Health.* The reference committee reviewed the report of the Committee on School Health and requested a change as follows: In Section 2 the report states "The Committee members present also recommended that each child in our public schools be tested by the teacher as to vision and hearing. The superintendent of Public Instruction should be informed of this recommendation." The reference committee recommends the deletion of the phrase "by the teacher."

This portion of the report was adopted.

9. *Report of the Liaison Committee of the North Dakota Bar Association.* The reference committee reviewed the report of this committee and found this to be satisfactory. They felt that a copy of this report might well be sent to every doctor in the state as a special mailing.

This portion of the report was adopted.

10. *Report of the Representative to the Governor's State Health Planning Committee.* The reference committee reviewed the report of the representative and moved the adoption of this portion of the report.

This portion of the report was adopted.

The motion was made by Dr. Boynton and seconded by Dr. Mahowald that the report as a whole be adopted. Motion was carried.

BRUCE BOYNTON, M.D., Chairman

R. M. FAWCETT, M.D.

J. S. GILLAM, M.D.

ROBERT GILLILAND, M.D.

Reference Committee to Consider the Reports of the Delegate to the A.M.A., Medical Center Advisory Council, and the Committee on Medical Education

Dr. Robert Tudor, acting for Dr. Foster, the chairman of this committee, presented the following reports and their discussions, which were adopted section by section and as a whole.

1. The reference committee commends Dr. Woutat for his excellent and comprehensive report to the House of Delegates on the progress and proceedings of the

Medical Center Advisory Council. The committee has no further recommendations other than those outlined in his report.

This portion of the report was adopted.

2. The reference committee wishes to congratulate Dr. Wright on his report as delegate to the American Medical Association and wants to re-emphasize his point on it not being of public or professional interest for a third party to derive profit from the practice of medicine; also, his points on the future conduct of the Joint Commission in regard to staff meetings. The disputed sections, 6 and 7, are now revised to state:

Section 6. A physician should not dispose of his services under terms or conditions which (1) interfere with or impair the free and complete exercise of his independent medical judgment and skill, (2) cause deterioration of the quality of medical care, or (3) permit the exploitation of his services for financial profit.

Section 7: In the practice of medicine, a physician should limit the source of his professional income to medical services actually rendered by him, or under his supervision, to his patients. His fee should be commensurate with the services rendered and the patient's ability to pay. He should neither pay nor receive a commission for referral of patients. Drugs, remedies, or appliances may be dispensed or supplied by the physician provided there is no exploitation of the patient.

This portion of the report was adopted.

3. The report of the Committee on Medical Education was reviewed by the committee who agreed on all the points brought out by Dr. Berg, Dean Harwood, and the committee. Attention is called especially to the clinical clerkship which has been a very stimulating program for the physicians of the state.

This portion of the report was adopted.

Dr. Tudor made the motion that the report be adopted as a whole, Dr. Dailey seconded, and the motion carried.

K. G. FOSTER, M.D., Chairman

W. C. DAILEY, M.D.

R. W. McLEAN, M.D.

R. B. TUDOR, M.D.

L. E. WOLD, M.D.

Reference Committee to Consider the Reports of the Standing Committees

Dr. Hammargren, chairman, presented the following reports and their discussions, which were adopted section by section and as a whole.

1. *Committee on Legislation.* The reference committee reviewed the report of this committee and commends them for the excellent work they have done during the past year. Their efforts in behalf of the amendment of our Medical Practice Act of Senate bill 186 should be especially praised. No recommendations have been given in this report for any further action, but the reference committee suggests that all the members of the North Dakota State Medical Association continue to cooperate whole heartedly with the committee in the future.

This portion of the report was adopted.

2. *Report of the Committee on Necrology and Medical History.* The reference committee reviewed the report of this committee and notes that during the past year 11 of our brothers passed from our midst, namely: Drs. Wilfred E. Blatherwick, Henry L. Halverson, Harry J. Fortin, Frank I. Darrow, J. A. Johnson, K. O. Knudson, Fred L. Wicks, Syver Vinje, Kenneth E. Fritzell, Trygve Oftedal, and Victor J. LaRose.

We would ask that this assembly stand in a moment of silence as a tribute to their memories. The House complied and, after a moment of silence, adopted this portion of the report.

3. *Report of the Committee on Public Relations.* The committee reviewed the report of this committee and noted that the Bismarck physicians set up a booth on

career night for the youngsters of Bismarck and the trade area. The committee feels that this kind of presentation is beneficial to the medical profession in the matter of public relations and that similar projects could be instituted around the state.

This portion of the report was adopted.

4. *Report of the Committee on Official Publication.* The reference committee reviewed this report and found no problems presented and no recommendations made.

The motion to adopt this portion of the report was tabled until after the appearance of Mr. Wolf, of THE JOURNAL-LANCET, who asked to appear before the House of Delegates.

5. *Report of the Committee on Public Health.* The reference committee reviewed this report and noted that no formal meetings were held. It was noted that the chairman had mentioned in his report that several problems are facing the committee in the near future.

This portion of the report was adopted.

Speaker Dodds next introduced Mr. Wolff from THE JOURNAL-LANCET, who spoke as follows:

"The things we have done in the last two years can be very quickly reviewed. I only mention them because of their application to you or your participation in them. I took the trouble to look through the JOURNAL-LANCETS for the year 1955 to see how many states had contributed papers to us. Between June 1955 and May 1956, North Dakota doctors had contributed 11 papers, and they came from Bismarck, Fargo, Grand Forks, Jamestown, and Northwood. In that same time, 19 states and 1 foreign country sent us papers. In the period between June 1956 and May 1957, we have received 8 papers from North Dakota; again these papers were from Bismarck, Fargo, Grand Forks, and Minot. In June 1957, I have been assured that North Dakota doctors will be contributing 5 papers, so the average is going to be higher for this year. We want to keep on getting more and more papers from North Dakota so that we can express your thoughts each year and enhance your prestige throughout the country. THE JOURNAL-LANCET is the mouthpiece for your members in the Northwest. It does get into every state and some of the articles are abstracted by the J.A.M.A., so there is some value in making a contribution in thought and getting it into print. You might just as well have this opportunity, as others are doing it. As JOURNAL-LANCET keeps on going through the years, we do want those papers from this area to be superior in numbers.

Up to about fifteen months ago, we allowed to stand on our Board of Editors many names from this section and the surrounding region that did not represent real work on THE JOURNAL-LANCET. We took counsel and asked, what can we do to build up the North Dakota State Medical Association in the country and ourselves with the North Dakota State Medical Association as a servant of it? We were told for one thing that we could have a greater representation on the Board of Editors. Out of 32 editors, about one-half of them are members of the North Dakota State Medical Association. We would like to have a greater number of working editors—that is, the working press or the people who actually write and edit. We should have more editorials. Regardless of whether people have time to write complete papers, they do have some time to air an opinion. They could write a little editorial for us. It would be quite a help to doctors who read THE JOURNAL-LANCET. Let us have more contributions and more correspondence. If you please, more editorials from the doctors in North Dakota.

They do not have to be polished or rhetorical. They could be written from the heart.

Another thing that is a very vital part of the service THE JOURNAL-LANCET renders to its people is the local news. We are dependent upon the clipping bureau, which has very little description about what is going on. We would like to have contacts with the different districts, preferably through their district society secretaries who could send us news, changes, or awards about the members—anything of importance that comes up, and this would make a more lively Journal. We have found that we are receiving more news from Minnesota, but we always do put North Dakota first. We feel in JOURNAL-LANCET a tremendous loyalty to the North Dakota State Medical Association. We would like a consistent flow of news so that we do not have to depend upon a clipping bureau.

If you wish any more information, please get in touch with me. We are devoted to you and if there is anything you want from us, please tell me right now and I will be the friend at court to make the special plea.

I would like to ask something from you. I would like one thing and that is to have you renew the arrangement with us for three years instead of a year each time. The Federal Communications System have all these radio and TV stations on trial contract for a three-year period. You can trust us as much as the United States can trust these communication organizations. Will you give us a three-year grant instead of a one year? We would appreciate this very very much. I thank you very much for letting me appear before you."

The motion was made by Dr. Boynton, seconded by Dr. Nugent, that the report of the Committee on Official Publication be taken from table so it could be acted on. Motion was passed. The motion before the House, which has not as yet been acted upon, is the approval of the report of the Committee on Official Publication, as published in the Handbook. The matter of a three year, instead of an annual renewal basis of our contract with THE JOURNAL-LANCET comes under the heading of New Business.

This portion of the report was adopted.

6. *Report of the Committee on Cancer.* The reference committee reviewed this report and notes that the com-

mittee has been very active. The Cancer Caravan was again presented throughout the state. They recommended to the medical profession their continued cooperation to the Committee on Cancer and the Cancer Society.

This portion of the report was adopted.

7. *Report of the Committee on Nursing Education.* The reference committee reviewed the report of this committee and noted that no formal meeting was held. There were no recommendations made.

This portion of the report was adopted.

8. *Report of the Committee on Maternal and Child Welfare.* The reference committee reviewed this report and concurred with the recommendations.

This portion of the report was adopted.

9. *Report of the Committee on Crippled Children.* The reference committee reviewed this report and noted an expanded program of service was discussed and reported at the meeting of the committee, December 8, 1956, but it was also noted that no acceptance or rejection was made on this expanded program.

10. *Report of the Committee on Diabetes.* The reference committee reviewed this report and moved its adoption.

This portion of the report was adopted.

11. *Report of the Committee on Mental Health.* The reference committee reviewed this report and noted that the committee met formally and discussed some of the activities of the North Dakota Mental Health Association and adopted a resolution as follows: "The Committee on Mental Health of the North Dakota State Medical Association recommends close cooperation by and full support from the physicians of North Dakota to the North Dakota Mental Health Association and the local mental health committees and associations or the volunteers of the communities in order to build up a healthy public attitude toward mental health and mental illness."

This portion of the report was adopted.

Dr. Hammargren moved that the report be adopted as a whole. Motion was seconded by Dr. Fox and carried.

A. F. HAMMARGREN, M.D., Chairman

A. R. SORENSON, M.D.

ROBERT PAINTER, M.D.

JOHN ELSWORTH, M.D.

TO BE CONTINUED IN OCTOBER



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A.C.H.A. News

The Student Health Service at Oregon State College, Corvallis, Oregon, has a vacancy for a male physician under 50 years of age. Anyone interested should write to Dr. D. C. Reynolds, director of the Health Service at the above address.

The secretary-treasurer's books have been audited, and all funds and equipment of the secretary's office were transferred during the week of August 5 to Dr. John Summerskill of the Health Service staff at Cornell University, Ithaca, New York.

President Wise has received an anonymous grant of \$5,000 to be used in setting up a permanent and self-contained secretary's office for our association. For the present, the office will be in the new Health Service building at Cornell University, Ithaca, New York. Plans call for the purchase of new equipment, and a secretary will be obtained whose only work will be for the association.

It is expected that this arrangement will continue for several years until the new constitution becomes fully effective and an adequate annual income will permit the expansion of the office and possibly its transfer to New York City.

All future correspondence and inquiries directed to the secretary of this association should be sent to Dr. John Summerskill, Student Health Service, Cornell University, Ithaca, New York.

Dr. and Mrs. Norman S. Moore returned about August 3 from a six week tour of the Scandinavian countries.

Dr. and Mrs. Ralph Canuteson returned from an extended tour of Europe in August.

Dr. Ruth Boynton also spent some time in Europe during the past summer.

News Briefs . . .

North Dakota

DR. F. E. WHEELON, who has retired after fifty-seven years of practice, the last forty-eight in Minot, was honored recently by two groups at separate testimonial dinners. At one affair, Dr. Wheelon was feted by his associates of the First District Health Unit. At the other, members of the Northwest District Medical Society and businessmen paid their respects. Purpose of both dinners was to honor the man who has been director of the health unit since 1946.

PLANS ARE UNDERWAY for construction of a Medical Clinic on the grounds of the Stanley Community Hospital at Stanley. Tentative plans call for erection of a 1-story frame building complete with basement. Estimated cost is approximately \$14,500. The building would provide ample space for 2 doctors and, if the need arises, there

(Continued on page 36A)

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Biliary Duct Tract and Gallbladder Surgery Fifteen-Year Experience

FRED ERENFELD, M.D.

Minot, North Dakota

THE FOLLOWING is a review of biliary duct tract diseases obtained from the records of Trinity Hospital, Minot, North Dakota, for a period of over fifteen years. Because bile duct tract disease is one of our most common medical and surgical problems and one that has evoked volumes of literature for nearly a century, I feel this is a timely subject. I offer this report of operative and pathologic study of surgical and autopsy material in 2,788 cases.

I will break down the disease as follows: (1) chronic cholecystic disease, (2) acute cholecystic disease, (3) choledocholithiasis, and (4) malignant neoplasm of the gallbladder and/or ducts.

We have found the following interesting data which correspond statistically very closely with that obtained in studies in 3 different sections of the country: (1) the eastern section in the Boston area at the Lahey Clinic, (2) a southern section in the Ochsner Foundation of New Orleans, and (3) the region of southern California in Los Angeles. In this series, the youngest patient operated on for cholecystic disease was 8 years of age; the oldest was 93—both had cholelithiasis. The ratio is 3.4 females to each male.

FRED ERENFELD is head of the Erenfeld Clinic and on the staff of Trinity Hospital, Minot, North Dakota.

Paper presented at the seventieth annual meeting of the North Dakota State Medical Association, Fargo, North Dakota, May 27, 1957.

I have divided the time into 2 equal groups, from 1942 through 1949 and 1950 through 1956. From 1942 through 1949, we found chronic cholecystic disease in 448 patients, with a total patient-hospital time of 15.29 days. From 1950 through 1956, there were 505 patients with this disease whose hospital stay was 11.8 days, a difference of four days. A total of 504 patients had acute cholecystic disease, with a hospital time of 13.8 days compared to 10.8 days. Cholelithiasis of the gallbladder was found in 631 patients in the first group and 739 in the second group, with a time of 16.6 to 10.2 days, well over six days less hospital time. Forty-four patients had choledocholithiasis during the first time period as against 48 in the second; ages ranged from 21 to 86 years. The 25 cases which were diagnosed as carcinoma of the gallbladder and bile duct tracts—9 from 1942 through 1949 and 14 from 1950 through 1956—were discarded from this study, since none of them had been verified by autopsy or by histologic examination. Reconstruction of ducts and/or re-explorations of the common ducts and hepatic ducts were performed in 14 patients from 1942 through 1949 and in 39 from 1950 through 1956.

I would like to call attention to the shorter patient-hospital days in the second half of this series as compared to the first half. I feel the reasons are: (1) better surgical technic and operating room procedures, (2) the more common use of blood in the second half, and (3) the use and availability of antibiotics as an adjunct in

treatment in the second period; antibiotics were not available in the entire first half.

Of the 504 patients with acute cholecystic disease who were admitted during the fifteen-year period, 389 were subjected to surgery before discharge. Of the 953 patients with chronic cholecystic disease, 748 underwent surgery. We do not know whether the patients who were not recorded as surgical patients were surgically treated later on in this series or at other institutions. Therefore, these patients were not considered in the statistics. Of the 92 patients who had choledocholithiasis, 81 were operated upon.

It is interesting to note that the patients having malignant disease of the gallbladder and/or the bile ducts varied in age from 37 to 83 years. The total number of patients admitted for biliary duct tract disease, ratio of carcinoma of the gallbladder and/or bile ducts is 0.8 per cent, were all verified micropathologically. This compares very closely to the percentage in the 3 other sections of the country. It should be noted that in 46,852 cases studied, a ratio as high as 1.23 per cent was reported.

Our experiences in diagnosis and the pitfalls in the treatment of bile duct tract disease follow. First, let me present the diagnostic criteria in carcinoma of the gallbladder. Diagnosis of neoplasms of the gallbladder and bile duct tract diseases is readily made if a gallbladder is hugely dilated and previous inflammatory disease is not the cause. We know that these dilated and distended gallbladders, palpable through the abdominal wall, are due to an obstruction caused by the neoplasm in the bile duct itself or in the head of the pancreas or in the ampullary portion of the duct. The gallbladder is palpable in at least 75 per cent of the patients with this disease. It is not tender. Major findings in malignant biliary obstructive diseases are ascites, jaundice, spider naevi, and collateral circulation. All aid in physical diagnosis, along with an enlarged, nodular, irregular liver. These findings make physical diagnosis clinically possible. Graham-Cole dye x-ray studies are of little or no avail in making a diagnosis. However, duodenal drainage by means of a tube is a very valuable adjunct. We have found the following procedure technically valuable and efficacious in the surgical treatment of cholecystic disease. Either an upper transverse abdominal or Kehr's incision, as the case may be, is made to give adequate exposure. Exploration of the upper abdomen is undertaken except in acute cholecystic disease. In such cases, we do little or no exploration and that only in the region of the gallbladder. We never sweep our hand over the right dome of the

liver in acute cholecystic disease because of the possibility of spreading infection into the subphrenic region and subsequent abscess formation. In other cases of cholecystic disease, however, this is a routine procedure to lower the liver and to better present the gallbladder and ducts. After the precursory exploration of the abdomen has been finished, the gallbladder is palpated for stones. If it is distended, we use a 50-cc. syringe with a large 16-gauge needle to aspirate its contents. The head of the pancreas, duodenum, and stomach are carefully examined because of present pitfalls in diagnosis, especially in regard to induration about the head of the pancreas, which is often mistaken for a neoplasm in this region. Examination of the duct is then accomplished with the left hand, index finger, and the thumb, taking care not to tear any vessels in this maneuver. We do not depend on this type of exploration to determine the presence or absence of stones because it is not reliable. Following the aspiration of the gallbladder and the examination of the duct, we tilt the table slightly toward the surgeon. We do not raise the gallbladder rest. This is a procedure which we condemn highly, since the patient, especially the aged, may undergo irreparable damage to the spine in this position of hyperextension-tension and during convalescence complain of severe pain as a result of this elevation. *It can only be accomplished* under anesthesia. Also, we believe it causes tension and stretch on the vessels and the bile ducts so that the anatomy in this area becomes distorted. Instead, we place the gallbladder on a slight stretch by applying a Carmalt forceps to the fundus but not enough tension to cause angulation of the common duct. After carefully dissecting away the fatty tissue with a Hilger forceps and severing of the duodenohepatic ligament using fine curved scissors, we identify the cystic duct and the common duct. We dissect further to clearly demonstrate the cystic duct and the adjacent cystic artery and its branches. Usually, we find an accessory cystic artery. The anomalies of the cystic artery are great and must be kept in mind at all times. We often find a lymph node about 1 cm. in diameter at the angle of the cystic duct and common duct junction. This lymph node must not be confused with neoplastic disease or with calculi in the common duct while being palpated. We believe the common duct should be opened in the majority of cases. This is borne out by the many subsequently necessary common duct exploratory surgical interventions. There is considerable difference of opinion on this subject. Many patients return with common duct stones after

surgical procedures so that, we believe, it is more than justified, and the morbidity rate is not increased appreciably. Recently, in carefully selected cases, we have found primary closure of the common duct a good procedure. The common duct must not be constricted or acutely inflamed, since cicatricial strictures will probably develop under these conditions if closed primarily. The primary closure of the common duct must be meticulously carried out so as not to constrict its lumen. The common duct can be explored in the following manners. The cystic duct is opened by clamping between the gallbladder and the common duct at least 6 mm. above the duct junction, and a French 10-12 catheter is run through the opening in the cystic duct into the common duct. We believe that surgical cholangiography is a very important procedure and ought to be carried out. An x-ray plate can be placed under the patient before surgery. The opaque media we found to be most efficacious is 30 per cent acetrizate (Urokon) or iodopyracet (Diodrast). The use of Lipiodol or other oily opaque media has not been as satisfactory as we would like, because of the likelihood and ease of injecting air bubbles into the common duct which simulates stones on x-ray examination. The average time required in all cases after dye is injected until the x-ray plate is returned to us for inspection and has been viewed by the roentgenologist was only seven minutes. This is well worth the time spent. If stones are found, of course, they must be meticulously removed. We irrigate the common and hepatic ducts with normal saline after removal of stones and invariably have found more stones washed out with the irrigant, especially from the proximal duct. It has been noted that many times stones in the common duct have been forced into the hepatic duct at surgery because of manipulation. These stones, if not removed, will necessitate surgery later. A surgeon may be condemned for not having removed all of the stones in the common duct when, in reality, these stones were not in the common duct at all but remained in the bile ducts in the liver. One must consider the fact that these stones may be present and search for them. Our opening into the common duct is usually 2 to 3 cm. below the junction of the cystic and hepatic ducts. We use Guy sutures of 5-0 chromic or fine silk. A procedure similar to that previously noted is carried out. T-tubes or primary closures are left strictly to the judgment of the surgeon. We use 5-0 chromic for suturing the common duct. The T-tube inserted is of latex rubber and must be tested prior to insertion, since many of these

tubes have been resterilized time and again and are not of good quality. If the T-tube does not stretch readily without tearing, it should not be used. We do not insert a T-tube through the ampulla into the duodenum, as our experiences with this procedure have not been satisfactory. We like to leave T-tubes in situ six to twelve months or more.

A word about the use of vinyl-plastic tubes—we have to report 4 cases of patients in whom vinyl-plastic T-tubes were inserted, with resultant disaster. We readily believe these failures were due to the plastic tubes. They are very stiff. The distal T was placed through the ampulla into the duodenum. The patients did well for a few days, but high fever and chills soon developed followed by jaundice, abdominal distention, and profound shock. The T-tubes drained bile. In spite of this, the patients became jaundiced. Three patients expired after four days, and 2 lived over a week. At autopsy, our pathologist found that in each case the distal portion of the tube compressed the pancreatic duct as it entered at the ampulla of Vater. This stiff tube so completely blocked the pancreatic duct that pancreatitis developed. The serum amylase was over 200 mg. per cent in several instances. One of the patients had a huge pancreatic abscess. In another patient, severe pancreatitis was verified by high serum amylase and subsequent autopsy findings. The findings were all similar in that the incompressible plastic tube entered the duodenum via the common duct and completely obstructed the pancreatic duct. Since these experiences, we have never used plastic tubes and have seen no similar complications. Our T-tubes are carefully anchored both in the common duct and in the abdominal wall. If we find a stricture at the papilla of Vater, a Bake's dilator 4 to 10 mm. in diameter is gradually inserted, which dilates the ampulla. If this is not easily accomplished, we do not hesitate to make a longitudinal incision in the duodenum and carefully incise the ampulla to relieve the spastic or cicatricial constriction. Occasionally, an impacted stone is found in this location.

The gallbladder is then removed from the base to the fundus. In our experiences, we have found it is best to drain the gallbladder bed in all our cases, and we use a large Penrose drain (4x8 cm.), one corner of which is placed into the foramen Winslow with the other corner overlying the repaired duct. The purpose is twofold: first, to drain bile from the liver bed and any leakage occurring at the duct; second, to prevent adhesions forming between the duodenum and stomach against the raw liver sur-

face. We have not found it advisable to suture the peritoneum in the gallbladder bed when using this particular technic. In removing the gallbladder from the fundus to the base, we have employed the following procedure. The serosa of the gallbladder is injected with normal saline to form a raised wheal of serosa. This facilitates incision of the serosa of the gallbladder, which can be freely stripped with the peritoneum in situ in the liver-gallbladder bed down to the ampulla portion. From here on, the technic is similar to previous methods, meticulous care being taken not to injure the hepatic duct, hepatic artery, or the common duct.

Injury to the right hepatic artery is more common than one would believe. Its anatomy must be clearly understood. If it has been injured or ligated, the outcome is always very stormy and, more often, fatal. Necrosis of the liver occurs, and the patient usually dies of severe liver damage. If, however, death does not ensue, later autopsy examination reveals atrophy of the right liver lobe. There was no record of a case in the entire series studied of injury to the right hepatic artery or portal vein.

Tumors in the bile ducts are rare but must be kept in mind at all times. They may be non-malignant or malignant. Neuromas in the stump of the remnant cystic duct must be considered. Our series show only 2 tumors of the common bile duct, both of which were malignant. Reconstruction of the duct is a tedious and most difficult procedure. The results obtained by the use of prostheses of Vitallium or plastic materials were unsatisfactory. The prosthesis either became plugged with bile salts and caused obstruction later or, as was so recently brought to our attention in the case of a politically prominent Englishman, the tube was passed into the intestinal tract with the subsequent cicatricial constriction of the duct. The best reconstruction possible is anastomosis of the hepatic common duct or the right hepatic duct with the duodenum.

A word about the conservative treatment of gallstones—I believe the time factor is very important, especially in old people who have gallstones as a complication with likelihood of other illnesses. If the patient has no contraindicated disease to prevent surgical intervention, surgery should be instituted. All cases studied of cancer of the gallbladder contained stones. Which occurs first—stones or cancer?

Acute cholecystic disease, we believe, is best treated as an emergency. Surgical intervention as early as possible gives best results. Antibiotics, proper preoperative preparation, and an early operation result in the least morbidity. In the

past few years, treatment of acute cholecystic disease has shown a *pronounced trend toward early* surgical intervention rather than the so-called "wait and see" cooling off period. The morbidity of complications has been markedly reduced, and deaths following complications in acute gallbladder disease are increased by those not so treated. We must remember that limited exploration is to be done in acute disease. Our series of those with acute disease so treated have done much better than those subjected to a so-called conservative cooling off period.

In regard to biliary dyskinesia, there are 2 types—spastic and atonic. The symptoms are identical, but they are managed differently. The patients with spastic biliary dyskinesia have qualitative dyspepsia, epigastric pain, fatty food intolerances, distention, and constipation. Usually, this type of dyskinesia is associated with a duodenal ulcer. Graham-Cole visualization of the gallbladder is not diagnostic. Although emptying time may be poor, this is a very difficult evaluation to make. Antispasmodics are indicated in the treatment of this type of disease. In the atonic type, the old adage of a fat, forty, overfed, underworked, and constipated female with a large gallbladder, poorly functioning on Graham-Cole examination, with a poor medical response are the signs and symptoms. For diagnosis in these types of cases, gallbladder drainage via the duodenal tube is very superior, in our opinion, to roentgenographic diagnosis.

The need for reconstructive surgery of the bile ducts has been found to be increasing in this country. We feel that, by and large, the inexperienced operators performing the surgery in the many operating salons now established in the United States have a great bearing on this. Statistics obtained from the Lahey Clinic show that whereas gallbladder diseases were of an incidence of 10 to 1 for reconstruction fifteen years ago, they now are doing 1 reconstruction to every 3 cholecystectomies. Over 90 per cent of these cases were attributed to surgical trauma. These figures are formidable, but I believe that one should evaluate them carefully. Many of these patients undoubtedly are referred to these centers for reconstruction surgery, whereas this was not done in the earlier years. I think it is well to note that in comparing statistics of European surgical centers with those in our country, it was found that there are probably fewer such injuries to the ducts in the European surgical centers than were reported here. I call your attention to the inaccuracy of these figures from abroad. I believe, however, they merit discussion. One of the reasons given for the lower sta-

tistical rate in Europe is that the surgeons in the European centers are said to be better qualified. They claim to have a better anatomic knowledge. Also, and probably more important, more restrictions are placed on those who operate. In spite of this fact, it is well known that Anthony Eden was referred from Europe to this country for reconstruction surgery after a surgical accident to his bile duct. It is well to note that meticulous medical knowledge and qualified surgical procedures are needed to perform this type of formidable surgery.

In summarizing, allow me to say that our study has shown that the patient mortality and morbidity in the last seven and one-half years have decreased remarkably over that of the previous year. Surgical technic has greatly improved through better understanding and vastly improved postsurgical care. Our study has also shown that reconstruction surgery is not procrastinated as was true a few years ago.

Qualified surgeons, good light, good anesthesia, good assistants, and adequate exposure are necessary in order to perform good bile duct tract surgery. We believe that no one has the right to attempt cholecystic surgery unless he is fully familiar with all possible anatomic variations and is able to cope with any pathology that he may encounter in the abdomen. He must have the mental equipment to handle any and all situations and complications that might arise.

Good nursing service, both during surgery and postoperatively, is very important if morbidity rates are to be low. It is not nearly as available as one would like to believe. We would like to reiterate that operative cholangiography is of great value and should be used without hesitation. It correctly reveals the normal conditions, presence of stones, and other valuable diagnostic information. The time it requires is repaid multifold.

Opening the duodenum for exploration of the ducts through the ampulla is not done as often as it should be, and we are sure that this procedure does not add to the morbidity of the patient. Bile duct strictures are not all caused by surgical accidents. We believe many of these bile duct strictures are due to original *acute inflammatory disease* and to the extravasation of bile and blood in the surgical field.

In closing, allow me to emphasize the fact that gallbladder surgery has many pitfalls, all of which can and must be overcome if the surgeon has a popular knowledge of normal anatomy, understands the possibility of meeting the unusual, and is equipped to handle whatever situation may arise. Most disasters of biliary surgery, and these are many, follow slipshod operating technic.

There is much more to be said regarding this important medical entity, but time has limited me to merely scratching the surface.

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Roscoe C. Webb, M.D.

A Personal Tribute

THE DEATH on August 16, 1957, of Dr. Roscoe C. Webb, chief surgeon of the Great Northern Railway, deprived the medical profession of an outstanding leader. THE JOURNAL-LANCET loses the advice and help of a valued member of its board of editors. He was a prodigious worker and a persistent fighter for that which he believed was right.

Dr. Webb's ability to organize and his skills as a surgeon brought innumerable benefits to medicine throughout the Northwest. Long a member of the faculty at the University of Minnesota, he made improvements in surgical procedures and brought innovations in bedside teaching to the University of Minnesota Hospitals that were later generally adopted.

Born March 10, 1890, in Amiret, Minnesota, Dr. Webb received a B.A. degree from the University of Minnesota and was graduated in 1914 from Johns Hopkins School of Medicine in Baltimore. He served a four-year internship and residency at New York Hospital in New York City, becoming resident surgeon at Cornell Medical School in 1917. He then entered Rockefeller Institute for special training in surgery of war wounds.

Dr. Webb went overseas with the American Expeditionary Force attached to Evacuation Hospital No. 8 and received a battlefield commission of Captain of the United States Army Medical Corps in the early action in which his hospital unit participated. As chief of his own surgical team, he and his hospital unit entered Germany with the American Army of Occupation. Later, the wartime activities of Evacuation Hospital No. 8 were recounted in a book entitled "Stretchers."

As a result of his experiences during the war, Dr.

Webb reorganized the technics and administrative policies applied to the surgical care of injured railroad employees. Many of his methods were later adopted as standard procedures by railroads throughout America.

Dr. Webb established practice in Minneapolis in 1919 and founded the Minneapolis Surgical Society in 1922, serving as its first presiding officer. At the time of his death, he was clinical associate professor of surgery at the University of Minnesota and an active member of the Hennepin County Medical Society, Minnesota State Medical Association, American Medical Association, Association of Railroad Chief Surgeons, Johns Hopkins Surgical Society, New York Alumni Association, Great Northern Railway Surgeons' Association, Western Surgical Association, Minneapolis Academy of Medicine (over which he previously presided), American Association for Surgery of Trauma, and the American College of Surgeons National Committee on the Treatment of Fractures and its Committee on Trauma.

Dr. Webb also belonged to Nu Sigma Nu medical fraternity, Masonic Lodge, the Minneapolis Club, and the Minikahda Club. He was on the staffs of Abbott, Asbury Methodist, and Northwestern hospitals and on the board of directors of the Minneapolis War Memorial Blood Bank.

Survivors include Dr. Webb's wife, Edith; 2 sons, Dr. Roscoe C. Webb, Jr. and Dr. Robert L. Webb; and 2 brothers, H. K. Webb of Houston, Texas, and T. R. Webb of Paris, France. Dr. Webb, Jr. is presently serving as associate resident surgeon at the University of California at Los Angeles Medical Center. Dr. Robert Webb is Lieutenant in the Medical Corps of the United States Naval Reserve.

Transactions of the North Dakota State Medical Association

Seventieth Annual Meeting

Fargo, North Dakota, May 25, 26, 27, and 28, 1957

REFERENCE COMMITTEE REPORTS CONTINUED

Reference Committee to Consider the Reports of the Committee on Medical Economics, Committee on Veteran's Medical Service, Committee on Prepayment Medical Care, and the Committee on Rural Health

Dr. Carl Baumgartner, chairman, presented the following reports and their discussions, which were adopted section by section and as a whole.

1. *Report of the Committee on Medical Economics.* The reference committee reviewed this report, and it was their thought that great strides have been made toward stabilization in x-ray fee schedules by the radiologists throughout the state by setting up the x-ray fee schedule for the national Blue Shield contract, which was passed favorably by the committee on Medical Economics. The committee, therefore, commended Dr. H. M. Berg and his committee for their accomplishments which, no doubt, required considerable time.

The reference committee agrees, as do some members of the Committee on Medical Economics that our fee schedules relative to the State Welfare Department and the Workmen's Compensation Bureau are due for revision in keeping with the present day fee schedules as dictated by economic situations. It is also noted that this reference committee made this same recommendation one year ago at our meeting in Aberdeen. We, therefore, recommend that the Committee on Medical Economics formulate a fee schedule for the Workmen's Compensation and Welfare Board for consideration of the council at its interim meeting. We concur that a relative fee schedule for the entire state from which other schedules, such as Workmen's Compensation, Welfare Board, and so forth, could be taken would be of inestimable value.

It was noted that the Medical Economics Committee carefully scrutinized the work of the Committee on Prepayment Medical Care pertaining to Dependent's Medical Care Act (P. L. 569) and found their working fee schedule satisfactory.

This portion of the report was adopted.

2. *Report of the Committee on Veteran's Medical Service.* The committee reviewed this report and noted that the committee had no cause to function in the past year, as was the case in the previous year. It is also noted that this liaison committee between the veteran's administration and the state medical association is now a permanent committee. We, therefore, recommend that it be retained as such.

This portion of the report was adopted.

3. *Report of the Committee on Prepayment Medical Care.* The reference committee reviewed this report and Chairman Baumgartner gave the following comments:

"Your Reference Committee wishes to commend Dr. C. H. Peters and his Committee on Prepayment Medical Care for their wisdom and tireless effort in setting up the schedule contract with the Department of the Army

of the United States in accordance with Public Law 569, pertaining to medical care of military dependents by civilian physicians and civilian hospitals. We feel that it was most valuable to have a mediation committee set up for the purpose of advising the executive secretary and also to advise the Department of the Army upon any disputes that may arise regarding the operation of this program within this state. It is our recommendation that the members of the committee who have been incidental in setting up the mechanics of this contract be retained to renegotiate with the Department of the Army should such renegotiation be initiated in the coming year.

"This reference committee is also of the opinion that this association should begin working upon a unit schedule so that, in the future, negotiations with any government agencies or other institutions will require a minimum period of time to review or set up a new fee schedule. Negotiations with the State Welfare Board and Workmen's Compensation must obviously, therefore, be initiated in the not too distant future.

"Your reference committee also notes that items proposed in the previous year were not discussed in this year's report. Namely, the report on the committee's study of the possibility of an association plan for life insurance; an association plan for malpractice insurance coverage; and the outcome of its study on the evaluation of the various prepayment medical plans which was postponed pending the results of the A.M.A.'s Commission on Medical Care Plans. It was agreed upon at that time by the Reference Committee that any educational program as to the uses, abuses, and necessity of prepaid medical coverage should await the results of the latter study. Your Reference Committee, therefore, wishes to have some statement as to the outcome of the above studies as proposed in the 1956 report of the Committee on Prepayment Medical Care."

Speaker Dodds inquired of Dr. Peters if he cared to discuss this further in accordance with the request of the Reference Committee. Dr. Peters responded as follows: "The executive secretary, at the direction of the Committee on Pre-Payment Medical Care plans, had polled the members of the association for their views on a statewide malpractice insurance plan. It was apparently felt by many members of this association that a statewide plan was not acceptable at this time.

The membership was also polled regarding a group life insurance plan for its members. The response was very poor, but this committee has before it another plan which will be presented in detail to the members of the association at a later date to see what their wishes may be.

This committee had previously been instructed to discuss ways and means of bringing to the attention of our members methods of avoiding abuse of prepaid medical

plans. This project had been tabled by this committee, pending the outcome of a very extensive survey being made by a committee of the A.M.A. This report is not ready and I think it advisable to wait upon a completion of their survey."

Dr. Peters then discussed and explained at length the Medicare Program which was put into effect in North Dakota on December 7, 1956.

Speaker Dodds thanked Dr. Peters for an excellent presentation, and, as there was no further discussion on the approval of the report, this portion of the report was adopted.

Speaker Dodds then stated that the House should express its wishes concerning the handling of the future contract with the Department of the Army of the United States Government. It appears that renegotiation of this contract by the council should be advocated. To do so, a motion from the House should be made.

Dr. Fischer moved that the House approve the council's renegotiation of the Medicare Contract with the Department of the Army in January, 1958. Motion was seconded by Dr. Erenfeld and carried.

4. *Report of the Committee on Rural Health.* The reference committee reviewed this report and noted that the Committee on Rural Health did not meet in the preceding year. Mention is made that Dr. W. A. Wright attended the National Rural Health Conference in Kentucky and reported on this conference at the North Dakota Public Health Association's annual meeting in Williston. It was also noted that an article on Rural Hospitals for the Council on Rural Health by the administration of the Elgin Hospital is being published in some of the farm publications.

This portion of the report was adopted.

Dr. Baumgartner moved that the report be adopted as a whole. Motion was seconded by Dr. Boynton and carried.

CARL BAUMGARTNER, M.D., Chairman
G. CHRISTIANSON, M.D.
V. J. FISCHER, M.D.
RALPH MAHOWALD, M.D.
FRANK MELTON, M.D.

Report of the Reference Committee on Resolutions and New Business

Dr. T. E. Pederson, chairman of the committee, presented the following resolutions:

RESOLUTION

Whereas, the members of the North Dakota State Medical Association attending the seventieth annual meeting of the association in Fargo having enjoyed the hospitality and kindness of this fair city, and

Whereas, the Mayor of Fargo and his associates, the press and radio, the hotels, and business men have made this session one long to be remembered,

Now, therefore, be it resolved that the House of Delegates express their appreciation by directing a copy of this resolution to the Honorable Mayor of Fargo.

This resolution was adopted.

RESOLUTION

Whereas, the Women's Auxiliary of the North Dakota State Medical Association has, through various projects entailing continuous work and effort, raised the sum of approximately \$12,000 for their Medical Student Loan Fund at the medical school of the University of North Dakota, and

Whereas, this fund has been of great value to many medical students and to the medical school, and

Whereas, other worthwhile projects, such as mental health and nurse recruiting improved the practice of medicine in North Dakota,

Now, therefore, be it resolved that the House of Delegates of the North Dakota State Medical Association convey to the Women's Auxiliary of the Association their appreciation and thanks for their excellent work and vision in this splendid project, and

Be it further resolved that a copy of this resolution be directed to the president of the Women's Auxiliary.

This resolution was adopted.

RESOLUTION

Whereas, the exhibitors have shown great effort and interest in this meeting and former meetings in developing their exhibits and adding to the scientific interest,

Now, therefore, be it resolved that the North Dakota State Medical Association extend to them our hearty welcome and thanks, and

Be it further resolved that a copy of this resolution be sent to each exhibitor.

This resolution was adopted.

RESOLUTION

Whereas, Dr. Leonard Larson, a trustee of the American Medical Association; Dr. Willard Wright, our delegate to the American Medical Association and chairman of the Medical and Related Facilities Committee of the American Medical Association; and Dr. C. J. Glaspel, secretary of the North Dakota State Board of Medical Examiners and president of the Federation of Medical State Boards, have done yeoman service and brought honor to the North Dakota State Medical Association,

Now, therefore, be it resolved that this association take cognizance of their services and pay tribute to these men for their efforts on behalf of the North Dakota State Medical Association, and

Be it further resolved that a copy of this resolution be forwarded to each of these men.

This resolution was adopted.

RESOLUTION

Whereas, Doctor Reuben Waldschmidt, president of the North Dakota State Medical Association for the year 1956-1957, has given untiringly and unselfishly of his time and services toward the continued progress of medical practice in North Dakota,

Now, therefore, be it resolved that the assembled delegates show their appreciation by a rising vote of thanks.

A rising vote of thanks adopted this resolution.

RESOLUTION

Whereas, the State Medical Society of Wisconsin has proudly endorsed its favorite son, Dr. Gunnar Gundersen of LaCrosse, trustee of the American Medical Association, for the office of president-elect of the American Medical Association, and

Whereas, the North Dakota State Medical Association is cognizant of Dr. Gundersen's capabilities and heartily supports him for the office of president-elect of the American Medical Association,

Now, therefore, be it resolved that the North Dakota State Medical Association support the candidacy of Dr. Gundersen, if he so chooses to run.

This resolution was adopted.

RESOLUTION

Now, therefore, be it resolved that the members of the North Dakota State Medical Association agree with the Colorado resolution read at the first session of the 1957 House of Delegates, as it pertains to the principle that it is not "in public or professional interest for a third party to derive a profit from payment received for medical services, nor is it in the public or professional interest for a third party to intervene in the physician-patient relationship."

Be it further resolved that our delegate to the American Medical Association be so instructed.

This resolution was adopted.

RESOLUTION

Whereas, Television and Radio are repeatedly expounding the cause of patent medicine firms and their products over the TV and radio stations and recommending these respective drugs to the public as cure-alls, thereby creating false claims and hopes for the general public, and

Whereas, these misrepresentations cause an irreparable harm to the general population in their misguided usage of such drugs recommended, and

Whereas, each individual is unto himself a distinct and separate problem, subject to susceptibilities and idiosyncrasies, oftentimes making these drugs contra-indicated.

Now, therefore, be it resolved that the House of Delegates recommend that our delegate to the A.M.A. House of Delegates exert every effort to have the A.M.A. House of Delegates give this matter serious consideration and obtain some relief from such dangerous advertising.

This resolution was adopted.

RESOLUTION

Whereas, the Devils Lake District Medical Society has submitted a resolution to the association regarding a directive of the Public Welfare Board of North Dakota of December 20, 1956, which resolution reads as follows:

Whereas, the directive of the Public Welfare Board of North Dakota of December 20, 1956, specifically relative to the expan-

sion of the scope of the North Dakota Crippled Children Services to include numerous medical conditions previously excluded, which can and have been adequately handled by the general practitioners of the state up to this time, and

Whereas, this addition would indicate further encroachment of socialized medicine on the private practice of medicine, and

Whereas, the members of the Devils Lake District Medical Society are unanimous in their feeling that the Crippled Children's program is inequitable in its discrimination against the general practitioner,

Now, therefore, be it resolved that the Devils Lake District Medical Society respectfully requests of the House of Delegates that a critical review of the conditions treated under the Crippled Children's program be undertaken. That conditions which can be cared for by the general practitioner be removed from the Crippled Children's program, and that new cases be admitted to the Crippled Children's program only on the written referral of their family physician,

Be it further resolved that this resolution be approved by this North Dakota State Medical Association.

Dr. Boynton spoke as follows in regard to the above resolution: "I am not sure what is being proposed here. I strongly believe that no matter who pays for the bill, the family doctor should decide what should be done with the child. There should be no failure on our part to say what we think. No organization should tell us what should be done with our patients. I prefer to do this myself. No organization should decide where this child should go. I would like to have this clear in this resolution."

The last paragraph of the resolution was then reread.

Dr. Boynton: "I do not believe that covers the problem which I am bringing up. We are still required as family doctors to turn the case over to the Crippled Children's Bureau, and they do as they wish. As far as I am concerned, the resolution should read 'under no circumstances should the Crippled Children's Bureau decide what doctor should take care of what kind of case.'"

Dr. Waldschmidt: "I think you will have to go back a little way to understand how this thing evolved. Many years ago, I was on the Advisory Committee of the Crippled Children's Bureau. At that time, the bureau out of Washington told our State Advisory Committee who should take care of this child. One prerequisite is that the physician has to be a board man; unless he is a board man, he will not be qualified."

Dr. Wright: "Dr. Boynton is correct; each doctor should have the right to refer his cases, but the regulations are that only a board man can take care of these cases. As a small group, we have nothing to say about this. This is a very familiar bureau device for keeping their program intact. There is little or no need for the Crippled Children's Bureau at this time. The defects existing at the time the bureau came into being do not exist now. They are being well cared for, in or out of the program. Therefore, the people who are running this are looking around for other avenues to keep their program intact. This association could concentrate on this one thing—that no further arbitrary extensions of the program are to be carried out with the approval of our association. We oppose the Crippled Children's Bureau extending their program into the care of new diseases. If you will concentrate on that one thing, you will accomplish more."

Speaker Dodds asked if there was any further discussion, and there being none, asked for a vote on the motion now before the House. He stated that if anyone wished to make a motion putting the House on record along these points, they were free to do so, although he thought the motion covered the subject. A vote was taken of the House of those in favor of the motion as presented. Votes were all ayes and the motion was carried.

RESOLUTION

Whereas, there is a real problem in providing for retirement of the professional man, and

Whereas, there are certain valuable tax advantages available to others through pension and profit sharing plans, and

Whereas, these are not available to the professional man,

Now, therefore, be it resolved that the North Dakota State Medical Association approve and recommend the passage of the Jenkins-Keogh bill (HR 9 and 10) and direct the secretary to send copies of this resolution to our representatives in Congress.

This resolution was adopted.

RESOLUTION

Whereas, the seventieth annual meeting of the North Dakota State Medical Association has thoroughly enjoyed and profited by the scientific program, and

Whereas, the host, the First District Medical Society and the various chairmen and committeemen have excelled in providing the membership of the association with the niceties of a gracious convention,

Now, therefore, be it resolved that assembled delegates demonstrate their appreciation by a rising vote of thanks.

This resolution was adopted by a rising vote of thanks.

Dr. Pederson stated that under the heading of New Business, the committee considered the request from the Tennessee State Medical Association to convert the state tuberculosis hospitals into thoracic hospitals. The committee wishes to refer this questionnaire to the council for proper disposition.

This portion of the report was adopted.

Speaker Dodds addressed the House as follows: "There is another matter to be taken care of under New Business which is the subject brought up by Mr. Wolff. At the present time, *THE JOURNAL-LANCET* is on a one-year basis, and they would like to have this on a three-year basis. What is the wish of the House?"

Dr. Nugent asked for a recommendation from the chairman of the Committee on Official Publication, Dr. E. H. Boerth, who recommended that the association sign the contract on a three-year basis with *THE JOURNAL-LANCET*. Dr. Henderson made the motion that a contract for three years with *THE JOURNAL-LANCET* be signed. Motion was seconded by Dr. Nugent and carried.

The chair next entertained a motion that the annual dues be maintained at the present rate. Motion was made by Dr. Jaehning, seconded by Dr. Boynton, and carried.

The next order of business was that of selecting a meeting place for 1958. The chair asked for an invitation from some city. Dr. Erenfeld responded as follows: "As a delegate from the Northwest District, I have been instructed to invite the association to hold their annual meeting in the city of Minot in 1958."

Dr. Boynton made the motion that the association meet in Minot in 1958. Dr. Nugent seconded the motion, and it carried.

Speaker Dodds advised the House that the council had received an invitation from the representatives at Bismarck to have a combined meeting with the South Dakota State Medical Association in 1962 to celebrate the seventy-fifth anniversary of the North Dakota State Medical Association. The council approves this and the chair feels that it would be well for the House of Delegates to express their wishes and, if in agreement, see that the steps are taken to invite the South Dakota Medical Association.

Dr. Gillam made the motion that the House accept this invitation from Bismarck for 1962. Motion was seconded by Dr. Strinden and passed.

T. E. PEDERSON, M.D., Chairman
F. A. DECESARE, M.D.
R. W. HENDERSON, M.D.
F. D. NAEGELI, M.D.

Dr. Peters, Chairman of the Nominating Committee, next presented his report.

NOMINATING COMMITTEE REPORT

President R. W. Rodgers, M.D., Dickinson
 President-elect O. A. Sedlak, M.D., Fargo
 First vice-president J. C. Fawcett, M.D., Devils Lake
 Second vice-president C. M. Lund, M.D., Williston
 Speaker of the House G. A. Dodds, M.D., Fargo
 Vice-speaker of the House R. E. Leigh, M.D.,
 Grand Forks

Secretary E. H. Boerth, M.D., Bismarck
 Treasurer E. J. Larson, M.D., Jamestown
 Delegate to A.M.A. W. A. Wright, M.D., Williston
 Alternate delegate to A.M.A. T. E. Pederson, M.D.,
 Jamestown

Councillors (terms expiring 1960):

Fourth District D. J. Halliday, M.D., Kenmare
 Fifth District W. H. Gilsdorf, M.D., Valley City
 Tenth District K. Vandergon, M.D., Portland

Board of medical examiners (terms expiring 1960):

C. J. Glaspel, M.D., Grafton; R. O. Goehl, M.D.,
 Grand Forks; W. A. Wright, M.D., Williston.
 State Health Council M. S. Jacobson, M.D., Elgin

Dr. Boynton made the motion that the nominations be closed and that the secretary be instructed to cast a unanimous ballot. Motion was seconded by Dr. Nugent and carried. All nominees were elected unanimously.

At this time, a ten-minute recess was declared and the House asked to reconvene with a third meeting. This was done because of the change in the By-Laws which must be passed at this session and which can only be done at a third session of the House of Delegates. Meeting adjourned at 4:00 P.M.

THIRD SESSION, HOUSE OF DELEGATES

Fargo, North Dakota, May 26, 1957

Speaker Dodds called the meeting to order at 4:10 P.M. The chairman of the Credentials Committee reported that a quorum was present. Secretary Boerth called the roll and the following delegates responded:

Drs. David Jaehning, Wahpeton; L. E. Wold, Fargo; F. A. DeCesare, Fargo; F. M. Melton, Fargo; James Houghton, Fargo; W. R. Fox, Rugby; R. M. Fawcett, Devils Lake; Robert Painter, Grand Forks; Bruce Boynton, Grafton; W. C. Dailey, Grand Forks; R. E. Mahowald, alternate, Grand Forks; A. F. Hammargren, Harvey; F. D. Nageli, Minot; Fred Erenfeld, Minot; G. Christianson, Valley City; Carl Baumgartner, Bismarck; M. S. Jacobson, Elgin; R. W. Henderson, Bismarck; R. B. Tudor, Bismarck; M. E. Nugent, Bismarck; T. E. Pederson, Jamestown; John Elsworth, alternate, Jamestown; Dean Strinden, alternate, Williston; R. F. Gilliland, Dickinson; and Robert McLean, Hillsboro.

There were 25 delegates present.

Dr. Boynton made the following motion: "I move that this addition to chapter VII, section 1, of the By-Laws be adopted: This sentence precedes the last sentence in this Chapter: 'A Councillor who fails to attend meetings of the council and whose absence in the opinion of the council is without good cause, shall be replaced.'" Motion was seconded by Dr. Fox and carried.

Dr. Boynton: "The suggested change in the By-Laws, chapter II, Annual and Special Sessions of the Association, section 1, is as follows: 'The annual session shall be held for four consecutive days beginning on a Saturday, which period of time should include the first Sunday in May.' I move the adoption of this change in the By-Laws." Motion was seconded by Dr. Jaehning and carried.

The chair offered the suggestion that the delegates from each district select one of their group and at their next District Medical Society meeting advise the members of the society of the actions taken.

Dr. Boynton: "Another suggested change is in regard

to committees and is as follows: Chapter 8, Committees, section 2.

Standing committees of the North Dakota State Medical Association shall be:

1. Committee on Scientific Program
2. Committee on Medical Education
3. Committee on Necrology and Medical History
4. Committee on Public Health
5. Committee on Nursing Education
6. Committee on Maternal and Child Welfare
7. Committee on Crippled Children
8. Committee on Public Relations
9. Committee on Legislation
10. Committee on Official Publication
11. Committee on Medical Economics
12. Committee on Veterans Medical Service
13. Committee on Prepayment Medical Care
14. Committee on Rural Health
15. Committee on Cancer
16. Committee on Diabetes
17. Committee on Mental Health

Section 3. Special committees may be appointed annually by the president. It is suggested that the president consider annually the formation of special committees as necessary:

1. Committee on Geriatrics and Rehabilitation
2. Committee on Emergency Medical Service
3. Committee on American Medical Education Foundation
4. Liaison Committee to the North Dakota Hospital Association
5. Liaison Committee to North Dakota State Pharmaceutical Association
6. Liaison Committee to the State Bar Association
7. Advisory Committee to Public Assistance Division of Public Welfare Board
8. Committee on School Health
9. Nominating Committee

"I move the adoption of these changes in the By-Laws."

Motion was seconded by Dr. Nugent and carried, and the changes have been accepted.

There being no further business to bring before the House of Delegates, the speaker of the House, Dr. Dodds, declared the session adjourned sine die.

SCIENTIFIC PROGRAM

Monday, May 27, 1957
 Crystal Ballroom, Fargo

8:30 to 9:30 A.M.—Registration.

9:30 to 10:00 A.M.—"An Analysis of Biliary Duct Tract Surgery Over a Fifteen-Year Period at Trinity Hospital, Minot, N. D., with a Report on Surgical Technic and Pitfalls of Gallbladder Surgery," DR. FRED ERENFELD, Minot.

10:00 to 10:30 A.M.—"The Diagnostic Value of Various Ocular Symptoms," DR. ROBERT W. HOLLENHORST, Rochester.

10:30 to 11:00 A.M.—Intermission.

11:00 to 11:30 A.M.—"The Diagnosis and Management of Vascular Headache," DR. LEONARD L. LOVSHIN, Cleveland.

11:30 to 12:00 noon—"The Present Day Status of Antibiotics in Medical Practice," DR. WESLEY W. SPINK, Minneapolis.

NOON RECESS

1:30 to 2:00 P.M.—"The Limping Child," DR. RONALD R. LANNIN, St. Paul.

2:00 to 2:30 P.M.—"Selection of the Patient for Cardiac Surgery," DR. JOHN F. BRIGGS, St. Paul.

2:30 to 3:00 P.M.—"Bronchopulmonary Segmental Anatomy and Bronchography," DR. CHAUNCEY N. BORMAN, Minneapolis.

3:00 to 3:30 P.M.—Intermission.

3:30 to 4:00 P.M.—"Treatment of Atherosclerosis: Concepts and Surgical Procedures," DR. J. EARLE ESTES, Rochester.

4:00 to 5:00 P.M.—"Clinicopathological Conference," DR. J. D. CARY, Grand Forks (pathologist); DR. JOHN F. BRIGGS, St. Paul (internist); and DR. C. N. BORMAN, Minneapolis (radiologist).

6:00 P.M. and 6:30 P.M.—Special society dinner meetings.

6:00 P.M.—Social hour and dinner, Gardner Hotel.

Program—North Dakota Academy of Ophthalmology and Otolaryngology.

Speakers—DR. ROBERT W. HOLLENHORST, Rochester, "Ocular Manifestation of Intracranial Vascular Disease;" and RICHARD C. LINDMARK, Benson Optical Company, "Ocular and Facial Prosthetics."

6:30 P.M.—Social hour and dinner, Gardner Hotel.

Program—North Dakota Society of Obstetricians and Gynecologists and the North Dakota Academy of General Practice.

Speaker—DR. ROY HOLLY, Omaha, "Iron Deficiency Anemias."

6:30 P.M.—Dinner, Graver Hotel.

Program—North Dakota Diabetes Association.

Speaker—DR. BENJAMIN WELLS, Hines, Illinois, "The Practical Laboratory Aspects of the Diagnosis and Management of Diabetes."

Tuesday, May 28, 1957

Crystal Ballroom, Fargo

9:00 to 9:30 A.M.—"Allergic Rhinitis and Eczema in Children," DR. ROBERT B. TUDOR, Bismarck.

9:30 to 10:00 A.M.—"The Echo and Coxsackie Viruses and Their Relationship to Paralytic and Nonparalytic Poliomyelitis," DR. HENRY W. KUMH, New York City.

10:00 to 10:30 A.M.—"Iron Metabolism and Pregnancy," DR. ROY G. HOLLY, Omaha.

10:30 to 11:00 A.M.—Intermission.

11:00 to 11:30 A.M.—"Convulsive Disorders," DR. SAMUEL LIVINGSTON, Baltimore.

11:30 to 12:00 noon—"The Management of Third Degree Burns," DR. PAUL R. LIPSCOMB, Rochester.

NOON RECESS

1:30 to 2:30 P.M.—Presidential Address:

DR. R. H. WALDSCHMIDT, president, North Dakota State Medical Association.

Introduction:

"50 Year Club" member and honorary members.

Inaugural Address:

DR. R. W. R. RODGERS, president-elect, North Dakota State Medical Association.

2:30 to 3:00 P.M.—"Liver Function and Function Tests," DR. BENJAMIN B. WELLS, Hines, Illinois.

3:00 to 3:30 P.M.—Intermission.

3:30 to 4:00 P.M.—"Obliterative Diseases of the Arteries," DR. RICHARD VARCO, Minneapolis.

4:00 to 5:00 P.M.—Panel Discussion: "Ulcerative Lesions of the Stomach," DR. B. B. WELLS, Hines, Illinois, pathologist and internist); DR. P. H. WOUTAT, Grand Forks (radiologist); and DR. RICHARD VARCO, Minneapolis (surgeon).

PRESIDENTIAL ADDRESS

R. H. Waldschmidt, M.D.

Fellow members and guests: We have gathered here for the annual address by the president of the North Dakota State Medical Association. Professor Bergen Evans of the Department of English at Northwestern University, stated that a speaker should not be disappointed when he is misunderstood. He said, "Most people are not listening, most don't understand; of those understanding, only some agree; of those who remember, only a few will ever be in a position to influence others and of these, some will change their minds and some timidly remain silent." And so, with this cheerful and optimistic note, let us proceed.

We must be ever alert to the insidious but constantly progressive penetration by federal and state governments into the shrinking realm of private medicine. Even though a government program at its inception may appear, on the surface, to benefit some segments of the profession and the general population we must realize that another hard won portion of our free enterprise system has been surrendered. Even today, many of our profession find themselves in direct competition with federal and state government medicine, which, due to complete tax subsidization, can offer a service free or at a very much lower figure than private medicine can afford to do. Thus, the doctor is in the paradoxical situation of paying the bill for the operation of a competing enterprise. The alarming consequences inherent in creeping socialism are evident. The trend must be stopped.

It is gratifying to hear that the polio inoculation program, which is endorsed by the American Medical Association, is gathering momentum throughout the nation. The American Medical Association was fully conscious of the gigantic scale of the projected immunization plan back in January 1957. President Dwight H. Murray pointed out, "There will be some who will say that

medicine should accept the Salk vaccine as just another vaccine and administer it accordingly, but the fact remains that we have a tremendous backlog of individuals who need to be vaccinated so that we can catch up with the immunization programs of other diseases." Since medicine is a public service profession, we should and must do everything possible to inoculate every eligible person regardless of ability to pay. Our state association and district societies should exercise leadership in this campaign to eliminate, if possible, the incidence of poliomyelitis.

This is to inform you that an interprofessional code of ethics is being formulated by the North Dakota State Medical Association and the North Dakota State Bar Association under the sponsorship of the A.M.A. I believe this is a step in the right direction. It will show the doctors and lawyers how to cooperate in bringing about just verdicts in court cases involving medical testimony. When this code is formulated it will be presented to the House of Delegates of the North Dakota State Medical Association for approval.

Although the present supply of physicians in the United States is better than that of all other nations, with the exception of Israel, we continue to hear the alarmists spread the false idea that there is, or will be a doctor shortage in America. Dr. Dwight H. Murray states that he sees no crisis or emergency in the present or future supply of physicians. He says this because the present supply is meeting public demand and because the future supply will meet future demand. The population of the United States has increased about 82 per cent since 1910. Our present population is about 168,000,000. In the same period, our medical schools have raised the number of graduates from 3,165 to almost 7,000 annually, a 120 per cent increase.

Medicare: Public law 569 was passed by the Eighty-fourth Congress to establish a federally sponsored medical care program for the dependents of members of the Armed Forces of the United States.

The law went into effect on December 7, 1956. It is under the direction of the Department of Defense and Department of Health, Education and Welfare, with the Department of the Army designated as the executive agent. The North Dakota State Medical Association will administer the act under a contract agreement with the Department of the Army. The fiscal agent of the North Dakota State Medical Association is the State Medical Society of Wisconsin. The North Dakota State Medical Association has negotiated a maximum fee schedule which is sufficient to permit the physician to charge the customary, usual, and reasonable fee for his service.

American Medical Education Foundation: It behooves every physician in the United States and its possessions to take a more active interest in the American Medical Educational Foundation. The cost of operating a medical school is so high these days, many of the schools have difficulty raising sufficient funds. This is particularly true of the privately endowed schools. For this reason, attempts have been and are being made today for the Congress to vote federal aid for medical schools. The American Medical Association has opposed federal aid for the reason that it will ultimately lead to the control of medical education in this country by the federal government. It has approved one-time grants for the construction of research facilities. Bills have been introduced in the present Congress to extend the grants to "teaching facilities." One of the bills (S.1922) would increase the federal share to two-thirds from a 50 to 50

basis, provided the school will give assurance that its freshmen class will be increased by 5 per cent. If continued, this trend will lead to control of the medical schools because the supreme court has said, "It is hardly lack of due process for the government to regulate that which it subsidizes." Because of this situation, the American Medical Education Foundation was established by the American Medical Association. Unfortunately, it has not been supported by the medical profession in many states, such as North Dakota. If we really believe that we have an obligation to the medical schools of this country by virtue of the fact that we received our medical education largely at the expense of the taxpayer or of an endowment fund and if we are convinced that federal aid to medical schools is dangerous, we should give and give generously to the American Medical Education Foundation.

The North Dakota State Medical Association should go on record opposing the practice of some private insurance companies in canceling the policies of sick persons. As a result, the public is developing a fear of the adequacy of private health insurance. I believe a resolution should be adopted opposing this practice.

There has been an alarming decrease in well qualified applicants for admission to our medical schools during the past few years. Many of our schools have difficulty in filling their classes with good material. This, I believe, can be somewhat improved by vocational guidance in our high schools through the various district medical societies.

The foreign physicians in our state have become a major problem that the State Board of Medical Examiners will have to cope with. It seems to me that their qualifications must be comparable to those of our own physicians who are graduates of our medical schools in the United States.

It is our responsibility to make a greater effort to attend more of the numerous excellent instructional meetings, conventions, and postgraduate courses throughout the country. Most of these meetings have been carefully planned so that we may receive maximum benefit. We must keep abreast of the rapidly changing concepts of medical practice.

As physicians, we have dedicated our lives to the relief of mental and physical ills, the prevention of disease, and the prolongation of life. These constitute a grave responsibility. They demand most of our physical and mental energies, and we must exercise the highest standard of morality. Often, they require complete disregard of our personal comforts or the demands of our families. The price we pay is high, but the rewards for devotion to our patients are great. As a profession, we have a priceless heritage. May we all do our part to deserve and uphold it and to pass it on to our successors.

Introduction: "50 Year Club" Member and Honorary Members

Dr. R. H. Waldschmidt: We now pay our respects to a very select group of 3 practitioners.

Dr. O. T. Benson, formerly located in Glen Ullin, North Dakota, until 1952 and now retired and living in California, graduated in 1905 from the School of Medicine of the University of Minnesota and was licensed in North Dakota in January 1907. He received his "50 Year Club" pin and certificate in 1955. In recognition of his unselfish devotion to his patients and his loyalty to the North Dakota State Medical Association, I present him with a certificate of honorary membership in the North

Dakota State Medical Association, dated May 28, 1957, signed by the president and secretary.

Dr. William H. Witherstine of Grand Forks received his "50 Year Club" pin and certificate in 1954. He graduated from Rush Medical School, Chicago, in 1904, was licensed in North Dakota in 1907, specialized in general surgery, was chief of staff at St. Michael's Hospital in Grand Forks, and a member of the faculty of the University of North Dakota Medical School. In recognition of his fifty years or more of proficient and untiring devotion to his patients and loyalty to the North Dakota State Medical Association, I present him with his honorary certificate signifying that he is an honorary member of the North Dakota State Medical Association.

Dr. Peter Boyum of Harvey, North Dakota, could not attend this meeting but we will forward his award to him. He graduated in 1907 from the Medical School of the University of Minnesota and was licensed in North Dakota in July 1909. In recognition of his unselfish devotion to his patients and loyalty to the North Dakota State Medical Association, he will receive his "50 Year Club" pin and certificate.

Dr. Sorkness, will you please escort the incoming president to the rostrum. We will next have the inaugural address by Dr. R. W. Rodgers, president-elect of the North Dakota State Medical Association.

INAUGURAL ADDRESS R. W. Rodgers, M.D.

Thank you, Doctor Waldschmidt. Your fine stewardship of the affairs of our association during the past year, the culmination of many years of hard work by you for the advancement of our interests, is deeply appreciated. It is hoped that those who follow you may have the opportunity to benefit from your experience and advice for many years to come.

For the past two and a half decades, we have been living in an era of momentous change with tremendous progress in medicine and health care. As doctors, we are all fully aware of the miracles being wrought by modern medicine, but I fear there are many among us who are less aware of the economic and social changes which are threatening our professional freedom. We cannot and should not oppose change, for this is the very essence of progress, but it vitally concerns us whether these changes are for better or for worse. The trend toward socialism in this country culminated in an attempt in 1949 to push through the Truman-Ewing plan for a system of national compulsory health insurance. This attempt to enforce socialization of medicine upon the American public was defeated only because of the vigorous campaign launched by the American Medical Association and organized medicine against the proposal, mobilizing articulate effective support from an overwhelming majority of the American people, that group of individuals outside the profession who firmly believe in free enterprise as opposed to the philosophy of the welfare state. We came very close to losing the battle, and we cannot now afford to relax our guard. The forces traveling under the banner of liberalism, though foiled in the big frontal attack, have never given up the fight. They are still attempting to accomplish their aim piecemeal by countless so called fringe measures by which the federal government would intrude into medical education, voluntary health insurance, medical care for dependents of military personnel, care of federal employees, construction of private medical

facilities, and a wide range of other activities. The impetus behind this is demonstrated by the increasing number of medical bills introduced each year at both the state and federal level.

We have today 22,000,000 veterans, many of whom have been indoctrinated into the ideas of this welfare state. Too many of our young people are so concerned with the philosophy of social security that they are willing to pay for it by relinquishing a portion of their freedom to the philosophy of, "Let Uncle Sam do it."

It is with alarm that we note that over 70 per cent of the admissions to the Veterans' Administration Hospitals is for the care of non-service connected disabilities to patients who in many cases can well afford to pay for their own medical costs. The time is long overdue for every doctor to inform himself about these facts and philosophy behind the VA program and to bring these clearly to the attention of the American public, as no legislation has ever approved the type of program which is developing. Let me emphasize here that the medical profession has and will always concur with the premise that the best possible care of those veterans who have service-connected disabilities is clearly a national responsibility, but that we are unalterably opposed to providing free care for non-service connected disabilities. Informed American people must decide soon, before it is too late, what the future course of the VA hospitals and Medical Program will be, lest by its continued uncontrolled invasion into the field of private medical care we obtain socialized medicine by default.

During the past year, a new program named Medicare has evolved. There is no unanimity of thought among physicians as to its meaning or what its impact will be. Thoughtful individuals among us believe that by pleading for the welfare of our Armed Forces, we have been forced to take one more step toward government control of medicine. Clothe it in any high powered phrases you can devise, it is socialism through and through. But, those of our members who spent so much time and effort to develop this program were impressed by the desire of the representatives of the Department of Defense to be fair to the profession. They feel it is the best plan that could be developed by cooperative planning between the government and the medical profession. It maintains a fee for service and free choice of physicians. It grants us our usual fees charged private patients of like economic status. If we, as doctors, fail because of greed, lack of restraint, and self-discipline, we are dead. The die is cast. We have no choice but to cooperate in every possible manner to assure the success of this program. Failure to do so would provide the social planners with strong arguments to press for the establishment of all out government control. It is earnestly hoped that every doctor in North Dakota will conform to the policy of charging his usual fair fee to those covered under this plan and that no investigation of excessive charges by a few will bring discredit to the profession as a whole.

One of the most notable achievements of our era has been the development of voluntary health insurance. It can be listed as one of the greatest advances in health care during our time. Let us not forget that it was Blue Shield that pioneered this development, took the initial risk, and showed the way. It was launched by the medical profession because commercial companies refused to take the risk, giving as their reasons the lack of actuary records and that health was uninsurable. Blue Shield has proved that health is insurable, and health insurance cost is now accepted as a normal item in the American family

budget. Some 112,000,000 people are today covered by some form of voluntary health insurance. Commercial companies have followed in its wake, and the presence of Blue Shield in the field has maintained fair and equitable premium rates by the insurance companies. Too many people and too many doctors look upon Blue Shield as just another insurance company. They fail to realize that Blue Shield is the only health plan which can offer a service contract. They fail to realize that Blue Shield is the only health plan that is fully under the control of the physician. It is your plan. The directors are all doctors, whom you elect on a proportional representation basis. The fees can be adjusted to the level which we desire. It is operated within the framework of the traditional doctor-patient relationship. Only through Blue Shield can the medical profession continue to control the economy of the medical practice; but, we must be on our guard because already labor unions are demanding that they be allowed to have representation on Blue Shield boards. Large segments of our population are demanding complete service plans. The leaders in Blue Shield do not consider this economically feasible and for many reasons unwise. Much work still remains before a satisfactory plan can be evolved which will satisfy both the doctor and the subscriber, and much work remains to be done before this can be accomplished. It is vitally important that the North Dakota Blue Shield plan be more closely identified with the North Dakota State Medical Association, and a full understanding of the workings of the plan must be brought to all of the doctors for the mutual benefit of both Blue Shield and the medical association.

The constant increasing cost of malpractice insurance is cause for concern. The number of actions brought and the size of the settlement is progressively upwards. Does this indicate a decline in our public relations? Does it indicate that there is a lessening of the traditional high esteem in which the doctor is held? Are we being considered merely as a business and not a profession? Unfortunately, the fault can frequently be laid at our own door. Some ill-considered remark, some unwarranted criticism, the raising of an eyebrow, or visible emotional reaction by some doctor has sown the seed of suspicion and resulted in malpractice action. If the situation is to be improved, it must come largely from within our own ranks. Careful work; accurate, well-kept records; more detailed explanation of what may be expected from certain procedures will accomplish much. Malpractice claims without merit must be contested to the bitter end. Paying even nominal sums to avoid unfavorable publicity in frankly nuisance suits is submitting to blackmail and banditry and will lead only to an increasing number of claims. Could we not agree that no malpractice suit could be settled in our state until it has been reviewed by a committee of disinterested physicians, assisted and advised by the best legal advice available. This committee would advise whether to fight a case to the last court or, if the facts warrant, to advise a fair settlement. The knowledge of the existence of such a committee would be a deterring influence.

Because of financial difficulties of most medical schools, there is a threat of governmental intervention. To prevent this contingency, the American Medical Educational Foundation was established. Industry and business have donated generously to the fund as they are fully convinced of the validity of its purpose. But, if we are to expect continued support from these outside sources, the medical profession itself must show more interest in

maintaining free medical schools unfettered by government controls. In North Dakota, the record of giving to this foundation is not one of which we can be too proud. A few have responded generously. Many have given nothing. Would it not be wise to follow the lead of several other states and make an annual assessment on every member. The amount need not be burdensome, but thereby each and everyone would assume his fair share of this responsibility. The fees we paid for tuition to our medical schools were but a small portion of the cost of our medical education. We have a just debt to our alma mater, which gave us the opportunity to reach the favored position which we hold today. We are asked to repay only a small part of this, but let us respond cheerfully.

In our relationships with the hospitals, all is not well. Certain administrators of hospitals would like nothing better than to see the hospitals take over practically full control of medical practice, enabling them to hire and fire doctors at will, paying the doctor a fixed annual salary of their determination, dictating the policies and method of practice, skimming off a profit from the skill and labor of the doctor. They have so expressed themselves in no uncertain terms. The recent court battle in Iowa and the recent objection by the hospital group to a certain clause in the Medical Practice Act, introduced in our own last legislature, is an expression of this thinking. If we are to continue to maintain for the medical profession the traditional respected position of the physician, we must arouse ourselves lest we become afflicted with a cancer of complacency, which will destroy us unless arrested. It is not to our credit that in a recent federal election only 10 per cent of the doctors voted. Time is running out on the voluntary system. If the

health program can be subjugated, there is nothing else that cannot be brought under control. We must constantly re-examine, re-evaluate, and then act.

Our future course should be crystal clear. We must first bring to the people the very best of modern medical care at a fee which they can afford to pay, holding before us the magic mirror of humility and dedicating our lives to forever learning. Second, we must accept our responsibility of assuming leadership in our individual communities and make available to the people information about health for which they look to us for guidance. Let us not overlook the transcendent position of the doctor as a citizen. Because of his broad educational background and his traditional record for integrity, his opportunity for influence is inestimable. The sad plight of the British doctor and his patients under a socialistic scheme should spur us on to fight militantly for professional and political freedom. We must not allow ourselves to become mere hirelings, technicians, and creatures of habit but must have convictions big enough and deep enough to give a lasting pattern to our professional life. We must continue to so conduct our professional, political, and social life that we will fully merit the trust and respect that have always been accorded those who practice our art to the end that we may pass on to those who follow the rich heritage with which we were endowed.

It is with a very real sense of humility that I accept this office, realizing the magnitude of its responsibilities. My hope is that, during the coming year, I may be able to justify your expression of confidence. I would ask for counsel and guidance from those who have preceded me and for wholehearted help and cooperation from every member of the society.

North Dakota State Medical Association Roster—1957

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Christianson, Gunder 117 N.W. 3rd, Valley City
 Gilsdorf, Walter H. 117 N.W. 3rd, Valley City
 Klein, C. J. 117 N.W. 3rd, Valley City
 Macdonald, Alexander C. 130 Central Ave. S., Valley City
 Macdonald, Neil A. 130 Central Ave. S., Valley City
 Merrett, Joseph P. 117 N.W. 3rd, Valley City
 VanHouten, J. 105 Main St. W., Valley City
 Wakefield, Kenneth M. Cooperstown

SIXTH DISTRICT

Anderson, Fredolph E. Underwood
 Arneson, Charles A. Missouri Valley Clinic, Bismarck
 Baumgartner, Carl J. Quain & Ramstad Clinic, Bismarck
 Benson, O. T. 1737 Whitley Ave., Hollywood 28, Calif.
 Berg, H. Milton Quain & Ramstad Clinic, Bismarck
 Berg, Roger M. Quain & Ramstad Clinic, Bismarck
 Bertheau, Herman J. Linton
 Blumenthal, Philip L. 307 1st St. N.W., Mandan
 Bodensab, William H. 520 Mandan St., Bismarck
 Boerth, Edwin H. Quain & Ramstad Clinic, Bismarck
 Boyle, John T. Garrison
 Brink, Norvel O. Quain & Ramstad Clinic, Bismarck
 Buckingham, T. W. 405½ Broadway, Bismarck
 Cartwright, John T. Missouri Valley Clinic, Bismarck
 Dahl, Phillip O. Missouri Valley Clinic, Bismarck
 Diven, Wilbur L. 402½ Main, Bismarck
 Enders, Walter R. (in service), Hazen
 Eriksen, Johan A. Quain & Ramstad Clinic, Bismarck
 Fisher, Albert M. 922 8th St., Bismarck
 Fredricks, Leonard H. Quain & Ramstad Clinic, Bismarck
 Freise, Paul W. Quain & Ramstad Clinic, Bismarck
 Froeschle, Rudolph P. Hazen
 Gaebe, Otto C. New Salem
 Girard, Bernard A. Beulah
 Goughnour, Myron W. Capital City Clinic, Bismarck
 Gregware, Peter Roy Quain & Ramstad Clinic, Bismarck
 Griebenow, Frederick 905 9th St., Bismarck
 Gutowski, Franz Wishek
 Heffron, Maurice M. 412½ Main, Bismarck
 Henderson, Robert W. Capital City Clinic, Bismarck
 Hetzler, Arnold E. 104 3rd Ave. N. W., Mandan
 Icenogle, Grover D. Capitol Bldg., Bismarck
 Jacobson, M. S. Elgin
 Johnson, Kenneth J. Quain & Ramstad Clinic, Bismarck
 Johnson, Marlin J. E. Quain & Ramstad Clinic, Bismarck
 Johnson, Paul L. Quain & Ramstad Clinic, Bismarck
 Kalnins, Arnold Washburn
 Kling, Robert R. Quain & Ramstad Clinic, Bismarck
 Kuplis, Haralds Turtle Lake
 Larson, Leonard W. Quain & Ramstad Clinic, Bismarck
 Levi, Wesley E. Quain & Ramstad Clinic, Bismarck
 Lindelow, O. Victor Missouri Valley Clinic, Bismarck
 Lipp, George R. 405½ Broadway, Bismarck
 Lommen, M. A. K. Capital City Clinic, Bismarck
 McGee, William J. 104 Missouri Drive, Riverdale
 Montz, Charles R. Quain & Ramstad Clinic, Bismarck
 Nuessle, Robert F. Quain & Ramstad Clinic, Bismarck
 Nugent, Milton E. Quain & Ramstad Clinic, Bismarck

Oja, Karl F. Ashley
 Orchard, Welland J. Linton
 Orr, August C. Capital City Clinic, Bismarek
 Owens, Percy L. Missouri Valley Clinic, Bismarek
 Perrin, Edwin D. Quain & Ramstad Clinic, Bismarek
 Peters, Clifford H. Quain & Ramstad Clinic, Bismarek
 Pierce, W. B. Quain & Ramstad Clinic, Bismarek
 Quain, Eric P. 2075 Raynor St., Salem, Oregon
 Radl, Robert B. Quain & Ramstad Clinic, Bismarek
 Schoregge, Charles W. Quain & Ramstad Clinic,
 Bismarek

Schoregge, Robert D. Quain & Ramstad Clinic, Bismarek
 Smith, Cecil C. 101 Collins Ave., Mandan
 Smith, Clyde L. Missouri Valley Clinic, Bismarek
 Spielman, George H. 305 1st Ave. N.W., Mandan
 Thompson, A. M. Quain & Ramstad Clinic, Bismarek
 Tudor, Robert B. Quain & Ramstad Clinic, Bismarek
 Vinje, Edmund G. Hazen Clinic, Hazen
 Vinje, Ralph 206 9th St., Bismarek
 Vonnegut, Felix F. Linton
 Waldschmidt, Reuben H. Quain & Ramstad Clinic,
 Bismarek

Walter, Paul A. F. Hazen
 Wittchow, Allen W. Quain & Ramstad Clinic, Bismarek
 Zukowsky, Anthony Ozone Bldg., Steele

SEVENTH DISTRICT

Arzt, Philip G. 401 3rd St. S. E., Jamestown
 Beall, John A. Medical Arts Clinic, Jamestown
 Cameron, Donald M. Kuhn
 Craychee, Walter A. Oakes
 Dagg, Earl W. Ellendale
 Elsworth, John N. DePuy Sorkness Clinic, Jamestown
 Fandrich, Harry A. Medina
 Fergusson, Victor D. Edgeley
 Freeman, John G. State Hospital, Jamestown
 Gronewald, Tula W. State Hospital, Jamestown
 Hayward, M. Alan Gackle
 Hewitt, John M. DePuy Sorkness Clinic, Jamestown
 Hogan, Clifford W. DePuy Sorkness Clinic, Jamestown
 Jansonius, J. W. Medical Arts Clinic, Jamestown
 Larson, Ernest J. DePuy Sorkness Clinic, Jamestown
 Lucy, Robert E. DePuy Sorkness Clinic, Jamestown
 Lynde, Roy Ellendale
 McFadden, Robert L. DePuy Sorkness Clinic, Jamestown
 Martin, Clarence S. Kensal
 Melzer, Simon W. Woodworth
 Miles, James V., Jr. DePuy Sorkness Clinic, Jamestown
 Nierling, Richard D. DePuy Sorkness Clinic, Jamestown
 Oster, Ellis Ellendale
 Pederson, Thomas E. DePuy Sorkness Clinic, Jamestown
 Saxvik, Russell O. State Hospital, Jamestown
 Sorkness, Joseph DePuy Sorkness Clinic, Jamestown
 Swenson, John A. DePuy Sorkness Clinic, Jamestown
 Tripp, Harry D. State Hospital, Jamestown
 Turner, Neville W. LaMoure
 Van der Linde, John M. Medical Arts Clinic, Jamestown
 Van Houten, Richard W. 301 Union Ave., Oakes
 Woodward, Robert S. DePuy Sorkness Clinic, Jamestown
 Young, John H. State Hospital, Jamestown

EIGHTH DISTRICT

Borrud, Chester C. Harmon Park Clinic, Williston
 Craven, John P. 411 Main St., Williston
 Craven, Joseph D. 411 Main St., Williston
 Ellis, Gordon E. Harmon Park Clinic, Williston
 Fennell, William L. Crosby
 Hagan, Edward J. 411 Main St., Williston
 Johnson, Alan K. Williston Clinic, Williston
 Johnson, P. O. C. Watford City
 Keller, John M. Williston Clinic, Williston
 Knobloch, William H., Jr. Tioga
 Korwin, J. J. 120 Main St., Williston
 Lund, C. M. Williston Clinic, Williston
 McPhail, Clayton O. Crosby
 Pile, Duane F. Crosby
 Sathe, Andrew G. Harmon Park Clinic, Williston
 Skjci, Donald E. Williston Clinic, Williston
 Strinden, Dean R. Harmon Park Clinic, Williston
 Walker, H. Charles, Jr. 411 Main St., Williston
 Wright, Willard A. Williston Clinic, Williston

NINTH DISTRICT

Buckingham, William M. Elgin
 Bush, Clarence A. Beach
 Curiskis, Adolfs A. Elgin
 Dukart, Christopher R. Dickinson Clinic, Dickinson
 Dukart, Ralph J. Dickinson Clinic, Dickinson
 Foster, Keith G. 109 W. 7th St., Dickinson
 Gilliland, Robert F. Dickinson Clinic, Dickinson
 Gilsdorf, Amos R. Dickinson Clinic, Dickinson
 Goulding, Robert L. Bowman
 Guloin, Hans E. Dickinson Clinic, Dickinson
 Gumper, Arnold J. 109 W. 7th St., Dickinson
 Hanewald, Walter C. Richardton
 Hankins, Robert E. Mott
 Hill, S. W. Regent
 Hiltz, Joseph A. Hettinger
 Larsen, Harlan C. 109 W. 7th St., Dickinson
 Maereklein, Otto C. Mott
 Martin, Gladys E. Dickinson Clinic, Dickinson
 Ordahl, Norman B. 109 W. 7th St., Dickinson
 Raasch, Richard F. Dickinson Clinic, Dickinson
 Reichert, Donald J. Reichert Bldg., Dickinson
 Reichert, H. L. Reichert Bldg., Dickinson
 Rodgers, R. W. R. 109 W. 7th St., Dickinson
 Schumacher, William A. Hettinger
 Smith, Oscar M. 509 1st Ave. W., Dickinson
 Spear, Albert E. 610 1st Ave. W., Dickinson
 Thom, Robert C. Bowman
 Tosky, Julian Hebron

TENTH DISTRICT

Dekker, Omar D. (in postgraduate training) Finley
 Kjelland, Andrew A. Hatton
 LaFleur, Harold A. Mayville
 Little, James M. (in service), Mayville
 Little, Roy C. Mayville
 McLean, Robert W. Hillsboro
 Mergens, Daniel N. Hillsboro
 Pearson, Lawrence O. Mayville
 Rosenberg, Mervin Hatton
 Vandergon, Keith G. Portland

ELEVENTH ANNUAL MEETING

WOMAN'S AUXILIARY TO THE NORTH DAKOTA STATE MEDICAL ASSOCIATION

Fargo, North Dakota, May 25, 26, 27, and 28, 1957

The eleventh annual meeting of the Woman's Auxiliary to the North Dakota State Medical Association was held in parlors B and C of the Gardner Hotel, Monday, May 27, 1957, at 10:00 A.M. The meeting was formally opened by Mrs. Charles A. Arneson, president.

The pledge of loyalty was given by Mrs. J. D. Cardy, state president-elect, and repeated in unison by the members present.

Mrs. V. J. Fischer gave the invocation and "in memoriam" which is quoted below:

It is with sadness and a keen sense of loss that we regret the deaths of 3 auxiliary members.

Our sincere sympathy is extended to the families of Mrs. M. W. Garrison of Minot, Mrs. F. O. Gronvold of Fargo, and Mrs. Frank A. Hill of Grand Forks.

Mrs. M. W. Garrison was a charter member of the Northwest District Auxiliary and was active in its work and program. Her death followed an illness of several years. Dr. Garrison and one son are the surviving members of her immediate family.

Mrs. Frederick O. Gronvold, a long time resident of Fargo, died January 7 following a lengthy illness. She was a charter member of the First District Auxiliary. Dr. Gronvold survives her.

Mrs. Frank A. Hill died unexpectedly on March 8 after the birth of twin daughters. She was an active and zealous member of several Grand Forks District Medical Auxiliary committees and, in addition, gave generously of her time and talents to her church, girl scouts, and the Y.W.C.A. Dr. Hill and five children are the immediate survivors.

Let it be known "that we, the members of the Woman's Auxiliary to the North Dakota State Medical Association, lifting our minds from the busy activities of the day, recall with tenderness the dear friends who are no longer with us, for whose devotion to the auxiliary we are grateful and whose memory will be cherished as a great part of our rich inheritance."

Mrs. V. J. FISCHER, First Vice President

Mrs. Arneson introduced our honored guest, Mrs. Robert Flanders of Manchester, New Hampshire, national president of the Woman's Auxiliary to the American Medical Association.

Mrs. Lee Christoferson, Fargo, gave the address of welcome. The response was given by Mrs. E. L. Grinnell, Grand Forks.

The roll was called by the secretary, Mrs. J. W. Jansonius, and the following were present:

Mrs. C. A. Arneson, president; Mrs. J. D. Cardy, president-elect; Mrs. V. J. Fischer, first vice-president; Mrs. J. W. Jansonius, recording secretary; and Mrs. R. W. McLean, treasurer.

State chairmen: Mrs. Clyde Smith, legislation; Mrs. Henry Kermott, Bulletin; Mrs. M. M. Heffron, press and publicity; Mrs. G. D. Gertson, historian; Mrs. G. H. Holt, revisions; Mrs. R. W. Rodgers, A.M.E.F.; Mrs. S. C. Bacheller, parliamentarian; Mrs. R. F. Gilliland, civil defense; Mrs. Edmund Vinje, nurse recruitment; Mrs. L. E. Wold, resolutions; Mrs. K. E. Fritzell, student loan fund fund; and Mrs. V. J. Fischer, program.

District presidents: Mrs. E. L. Grinnell, Grand Forks; and Mrs. Bernard Mazur, Fargo.

Delegates: Mrs. H. Reichert, Dickinson; Mrs. Robert Turner, Grand Forks; Mrs. Nelson Youngs, Grand Forks; Mrs. Robert McFadden, Jamestown; Mrs. R. D. Nierling, Jamestown; Mrs. E. T. Keller, Rugby; Mrs. J. D. Craven, Williston; Mrs. Samuel Shea, Minot; Mrs. D. N. Mergens, Traill-Steele; Mrs. C. Baumgartner, Bismarck; and Mrs. R. H. Waldschmidt, Bismarck.

Councillor: Mrs. O. M. DeMouly, Flasher.

A motion was made by Mrs. E. T. Keller that the minutes of the tenth annual meeting be accepted as printed in the October 1956 issue of THE JOURNAL-LANCET.

Mrs. Robert McLean then read the Treasurer's Report and asked that all outstanding bills be presented.

Treasurer's Report

Mrs. Fischer and Mrs. Gilliland were appointed to the auditing committee.

Receipts:

Bank balance: August 1, 1956	\$1,481.80
Dues:	
299 members at \$4.00	1,204.00
2 dues arrears	
1 honorary member	
Sophomore student loan contributions	2,368.90
Sale of handbooks (21 at 50 cents)	10.50
Sale of anniversary issue (21 at 25 cents)	5.25
Travelers check (Aberdeen convention)	10.00
Registration fees, Fargo (99 at \$1.00)	99.00
Convention contribution from North Dakota State Medical Association	200.00
Convention luncheons and dinner	457.90

Total Receipts \$5,837.35

Disbursements:

Dues to National (302 at \$1.00)	\$ 302.00
U.N.D. Sophomore student loan fund	2,368.90
President's expenses:	
National convention	\$265.00
Chicago conference	100.00
Discretionary fund	24.49
Miscellaneous	15.00
	\$404.49

404.49

President-elect's expenses:

Chicago conference	\$100.00	100.00
Newsletter and stationery:		
Three issues of News Views and Cues in April, October and December	93.61	
Conrad Publishing Co.—anniversary issue (520 copies)	135.15	
Postage and handling (anniversary issue)	19.06	
	247.82	247.82

Standing and special committees:

Press and publicity	8.02	
Recruitment	22.88	
Legislation	1.50	
Student loan	3.61	
Treasurer	4.00	
Public relations	2.25	
	42.26	42.26

Miscellaneous:

Flowers for president (Chicago Conference)	6.64	
Bank fees	1.12	
	7.76	7.76

Convention expenses:

L. G. Pratt Co.	15.81	
Mrs. R. D. Weible (convention chairman)	7.71	
Fargo Country Club Luncheon	202.08	
Shotwell Floral	57.12	
Fredericks Flowers	48.35	
Fargo Floral	17.29	
Gardner Hotel (luncheon and dinner)	402.10	
	750.46	750.46

Total Disbursements \$4,223.69

Mrs. C. A. Arneson then presented Dr. R. H. Waldschmidt, president, North Dakota State Medical Association. He gave a very interesting and inspiring "greetings" message. He stated that he felt very privileged in

greeting us on our tenth year of organization and service and that he felt we had had a profound effect on the laity and the medical society. He praised our successful work in immunization clinics and stated that our programs should be continued, as all of them are worthwhile as good public relations. He stressed the great need for contributions to A.M.E.F., since the cost of operating a medical school was so enormous. He mentioned that there had been an alarming decrease in good material in medical schools, and he thought this could be improved by vocational guidance in high school. He also stressed the very important role we could play in helping those who are mentally ill.

Mrs. C. A. Arneson presented the following president's report:

President's Report, 1956-1957

The first ten years of medical auxiliary activities in North Dakota were completed on May 26, 1957, with evidence of continued interest and of more work and activity in each field of endeavor. With this tenth anniversary, it is revealed that the physicians' wives of North Dakota have carried out most all the national auxiliary objectives and have made an enviable record, with accomplishments comparable to any state. It is with considerable pride that we now look back at these ten memorable years of auxiliary in North Dakota.

The theme for this past year has been "Fun, Service and Health." Our members have found that auxiliary can be FUN, as well as of considerable SERVICE to our husband physicians and the community, and likewise do much for the promotion of HEALTH.

Our contributions to the American Medical Education Foundation are now in the third year, with a total of \$323 for this year. This is more than 7 times our first year's contribution and indicates that with increased information on this project, our influence and effectiveness will grow.

In the promotion of *Today's Health* and *Bulletin*, it has been found that in the districts in which these subscriptions are included as a "package deal" as part of the annual dues, the number and appreciation of these two aids to auxiliary work is the highest. In the case of the *Bulletin*, the total number of subscriptions has increased but still only represents about a fifth of our total membership. In this group, however, there has been an increased reference to the *Bulletin* with greater utilization, indicating that in time, as its value is realized, the total subscriptions should increase.

Close cooperation and congenial relations continue to exist with the state medical association. The state president presents the auxiliary's annual report to the state medical association's House of Delegates in person at the time of the state convention. This report has been very well received by the doctors.

The annual fall board meeting, followed by a school of instruction, was very well attended. This meeting in September proved a stimulus to the many competent newly elected officers and newly appointed state chairmen. This conference, as it has in the past, actually spearheaded the many projects and worthwhile activities that followed during the year.

Organization. During the ten years of auxiliary in North Dakota, our entire state has remained organized into 10 districts. From the 163 charter members at the time of our organization, we have grown to 300 at the time of this printing. This represents about 86 per cent of our total potential membership.

Program. The various district auxiliaries usually meet at the same time there is a meeting of the component district medical society. Programs and types of meetings have shown wide variations pertinent to the local situation. Most all phases of the state and national programs have been undertaken by each district, in addition to projects or activities of interest or benefit to the local group or community.

Public relations. Innumerable acts of public service in the community by collective or individual auxiliary members make up most of the commendable type of public relations. Specific acts, such as wiring hospital rooms for TV, adopting a medical exchange student from Africa, taking an active part in community health programs, and similar deeds, are too numerous to mention. This role on the part of the North Dakota doctors' wives has created good public relations.

Rehabilitation. A short paper entitled, "Auxiliary Opportunities in Rehabilitation," was given at the thirtieth annual conference of the Woman's Auxiliary to the American Medical Association. The editor of *Performance*, the monthly publication of the president's Committee on Employment of the Physically Handicapped, asked to reprint this paper in this nationally distributed magazine. This was carried out with the permission of the national auxiliary executive secretary, who considered its publication good public relations. The story of rehabilitation in North Dakota was enlarged upon further by the official auxiliary president's message in visitations to the various district auxiliaries.

Community service. Every district auxiliary has reported participation in some community health or welfare effort. This includes Red Cross, polio drives, cancer society, heart fund drives, girl and boy scouts, P.T.A.'s—in fact, name any worthwhile project, and several medical auxiliary members will be found among the volunteer workers.

Legislation. In legislation, along with the North Dakota State Medical Association, we were concerned with 12 house and 17 senate bills during the thirty-fifth North Dakota legislative assembly. The session was almost entirely favorable to medicine. Federal legislation has been watched with interest at the present time in HR 2125.

Funds. The sophomore medical student loan fund now totals over \$12,000. This continues to be our largest project since its inception in 1951.

Publications and publicity. The state publication, issued 4 times a year, is the mimeographed Newsletter, *News, Views, and Cues*, which is sent to all doctors' wives in the state. The scope, importance, size, and all phases of this publication have greatly expanded and were climaxed by the first printed publication this spring, in an attractive 8-page, tenth anniversary edition. The importance of this publication in maintaining interest and continued activity in the auxiliary is believed immeasurable. Auxiliary members receive considerable publicity in local newspapers, radio, and TV.

The auxiliary records and the first volume of our history have been placed in the state executive secretary's office.

Recruitment. Nurse recruitment, always an active project, with its change to recruitment, has taken on a new look in North Dakota with even more enthusiasm and activity. Included, in addition to recruitment of nurses, is the recruitment of medical technicians, medical record librarians, medical social workers, occupational therapists, x-ray technicians, physiotherapists, and

dictitians. Most phases of recruitment have been utilized, with high school "Career Days" being the most popular method.

Mental health. Efforts in mental health have been primarily directed toward education and publicity in creating a greater awareness of the problems involved in the successful care and treatment of the mentally ill, as well as a tolerant attitude toward the mentally ill.

Civil defense. In the 5 districts with civil defense programs, there is an average of 40 per cent of the auxiliary members participating in some category of the program. One of our members has been appointed assistant civil defense administrator.

Safety. The project of safety was not undertaken until January with the appointment of a state chairman. From this start, it now appears that safety will occupy a prominent place in next year's programming.

As state president, I attended the national auxiliary convention last June; where I was a member of a public relations panel; and the fall conference for presidents and president-elects, where I was a member of the program panel. I have visited 9 of the 10 district auxiliaries, and, at 7 of these, I talked on auxiliary in North Dakota, giving special attention to legislation, rehabilitation, and public relations. In all my visits, I have been impressed by the wonderful hospitality and the congeniality of the district societies, as well as with the importance of all their varied activities and projects.

I wish to express my sincere thanks and appreciation to all the national officers and chairmen, as well as to my own state officers and chairmen.

To have served as president during the completion of this tenth year has been an unusual pleasure and honor. In reviewing the auxiliary's accomplishments, it is realized that only through the coordinated effort and interest of all our women has progress been made. With the first ten years now in the past, the North Dakota Woman's Medical Auxiliary may look forward to the second decade with an even greater promise of achievements.

MRS. CHARLES A. ARNESON, President

The following reports were given by the other officers, state chairmen, and auxiliary presidents:

Organization and Membership Report, 1956-1957

Name of state: North Dakota.

Number of medical societies in state: 10 districts.

Number of organized medical auxiliaries in state: 10 districts.

Number of counties or districts organized during the year: none.

Number of members at large: none.

Number of counties or districts disbanded during the year: none.

Total state membership: 300.

Total potential membership: 350 (approximate).

Possibilities of organizing additional medical auxiliaries in this state depends entirely upon the North Dakota State Medical Association.

MRS. JAMES D. CARDY, President Elect and Chairman

Public Relations Report, 1956-1957

The medical auxiliary of North Dakota has done a great deal in the field of public relations this past year. Good public relations are carried on each day by our members through their willingness to participate and cooperate in local community projects. One woman energetically solicited funds to have every room in the local hospital wired for TV; another is a member of her local park board.

Many of our women have been active in Red Cross, public drives, cancer society, mental health, civil defense, health clinics, heart fund drives, girl and boy scouts, P.T.A.—name any worthwhile project and you will doubtless find several Medical Auxiliary members among the volunteer workers.

All districts have contributed to our sophomore medical students' loan fund with proceeds from teas, style shows, and bridge parties.

Contributions to A.M.E.F. have increased. Medical recruitment has received attention, with teas, meetings for future nurses clubs, and scholarships, and a film on "Medical Technology as a Profession" was shown in several high schools.

One district auxiliary has adopted a medical exchange student and his family from Africa, provided them with household necessities when they arrived and Thanksgiving and Christmas baskets of food and toys.

MRS. THOMAS LONGMIRE, Chairman

Legislation Report, 1957

The Committee on Legislation of the North Dakota State Medical Association was involved with 12 House and 17 Senate bills during the thirty-fifth legislative assembly. The committee was most successful in its efforts, for the 9 bills actively supported were passed, and the 3 bills actively opposed were defeated. Other bills with which they were concerned were followed with interest or possibly with token support or opposition.

Among the bills actively supported and passed were the following: SB 5—appropriates \$437,500 to the State Health Department; SB 181—creates medical center loan fund for medical students who agree to practice medicine in North Dakota; SB 186—modernization of the laws governing practice of medicine; HB 517—\$289,000 for special education of exceptional children; and HB 535—authorizes limited scholarship plan for psychiatrists who agree to serve in state hospital and mental health clinics.

Among the bills defeated which the North Dakota State Medical Association opposed were: SB 92—allows chiropractors to sign accident and sickness insurance claims; and HB 796—amend code relating to practice of osteopathy, which would give full drug privileges to osteopaths.

On the national scene, an important factor to consider is the scope of medical care for federal beneficiaries. Today nearly 1 out of every 4 persons, including over 22,000,000 veterans, is eligible to receive at no cost to them some degree of medical care from the federal government. Included are military personnel and their dependents, beneficiaries of the Public Health Service, over 5,000,000 public assistance recipients, 370,000 Indian and Alaskan natives, and 4,000,000 beneficiaries of the Federal Bureau of Employees' Compensation (at work injuries only).

One of the latest federal programs is Medicare, or military dependent medical care, which went into effect December 7, 1956. The part of this which will interest most private physicians is the authorization for civilian as well as military care for spouses and dependent children of persons on active duty for more than thirty days. This program is being watched with interest by the medical profession for the possibility of its far reaching results.

Soon, a second and more extensive federal aid medical program will be started. Four categories of persons receiving public assistance will be eligible: old age, child aid, blind, and disabled. States must match the federal

funds 50-50. In North Dakota, 8,171 persons will be eligible for old age; 5,362 for child aid; 121 for blind; and 990 for disabled assistance. Maximum possible United States funds available for North Dakota will be \$878,640.

We have been alerted by our national legislation chairman about the new civil defense bill HR 2125, which proposes to set up a new executive department of the government for civil defense. Our part is to ask our representatives to emphasize the health and medical aspects of the bill.

The Jenkins-Keogh bill and the Bricker Amendment are again coming up for action. They are not less important because they have been considered before. Continue to support them—perhaps this session will see them passed.

MRS. CLYDE SMITH, Chairman

Program Report

National theme, "Health Is Our Greatest Heritage"

North Dakota auxiliaries have done well in carrying out the aims and purposes of the program committee which are: (1) to interest members in the aims and objectives of the auxiliary and the American Medical Association. (2) to provide authentic information concerning health standards and auxiliary health projects, and (3) to generate a warmth of fellowship among physicians' families.

We have used many of the suggestions sent on to us by the national program chairman. In addition, programs have been arranged that are pertinent to local situations, and projects have been undertaken which are of benefit to our own communities and state.

The recruitment program was enlarged this year to include not only nurse recruitment but other allied fields as well. Several districts have future nurses clubs, teas for prospective nurses, show films on medical technology, and one district is compiling information on all available scholarships for nurses.

Many of our auxiliaries are taking an active part and interest in civil defense particularly in areas where ground observer posts and filter centers are established.

An increasing awareness that mental health is a major problem in North Dakota as in other states is stirring more districts to include this subject in their programs. One district successfully encouraged women's organizations in their communities to have local physicians talk to them on mental health.

Several districts are handling the sale of *Today's Health* and the *Bulletin* in package deals along with their dues.

A rural health chairman has been included in our roster of standing committees since 1952, and this year a safety chairman was appointed.

Four times a year our press and publicity chairman publishes a most interesting newsletter that seems to bind us together as a state organization. Through it we are kept informed of important legislation, the activities of other districts, and interesting happenings in the lives of other auxiliary members.

A.M.E.F. is a relatively new committee, and each year as it becomes better established and the needs for medical education are more widely known, larger sums of money are turned in for this national project. During Medical Education Week in April, one district is securing television time to show the A.M.E.F. film, "Danger at the Source."

Legislation is important program material, and ex-

cellent work is being done to keep us informed of legislation on both national and state levels.

Other programs successfully used in our state deal with city sanitation, various phases of Red Cross, speeches on polio, blood banks, a report on the state TB program and Christmas seals, and the use of films dealing with family counseling and A.M.E.F. films.

As a state project, our sophomore medical student loan fund for the University of North Dakota Medical School is probably one in which more of us are directly involved than any other. In the years of its existence, a very substantial sum of money has been raised by various means, such as fashion shows, teas, dinner parties, bake sales, donations, and sale of household paper items called a "Paper in a Poke" project and sent to the medical school to be made available as interest free loans to deserving medical students who are in need of temporary assistance to complete their medical educations. We are very happy indeed with the success of this project.

Other potential auxiliary programs and projects still remain to be investigated and explored, but in the ten years of our organization's existence, we can look back over them as good and productive years and justifiably have a feeling of awe and respect for the accomplishments of but a few hundred diligent and enthusiastic women scattered over a large area who are working with a common purpose and interest in mind.

MRS. V. J. FISCHER, Chairman

Recruitment Report

Nurse Recruitment has been changed to Recruitment and has had a very active start in North Dakota. Each district president was asked to appoint a committee of 2 or more to work with the recruitment chairman, and some fine reports have been received.

Films have been shown at schools, future nursing or health career clubs, and auxiliary meetings.

Information on scholarships and loan funds has been relayed to P.T.A. groups, school principals, hospital guilds, other organizations, and—most important—to students. See note on scholarships following this report.

Tours through hospitals, schools of nursing, and medical laboratories have been conducted for students.

Panel presentations have been given in high schools and future nurses clubs.

Teas have been given for those interested in health careers, with panels presenting information on allied health fields. Doctors' wives have acted as counsellors for health careers.

Career days have been the most popular method of recruitment, with the following fields represented: medicine, pharmacy, dentistry, medical technology, x-ray technology, medical social work, nursing, practical nursing, public health nursing, occupational therapy, physical therapy, medical records library work, dietetics, and dental hygienics. Two basic methods have been successful:

1. Career day or night with booths; pamphlets are provided; registry is taken; and individual consultation in the above fields is available.

2. Career day or night with the foregoing fields represented by panel presentation of 3 or 4 careers in one room followed by questions and answers; individual consultation is available; pamphlets are distributed; and registry is taken for follow-up of students. Each

speaker gave his or her talk three times to three different groups.

Many organizations have cooperated with the auxiliaries in the recruitment program: North Dakota State Medical Association (also A.M.A. and district associations); North Dakota State Employment Service; North Dakota Welfare Service; hospital guilds; P.T.A.'s; County Schoolmen's Association; Association of University Women; Kiwanis, Rotary, and Lions Clubs; Chamber of Commerce; all schools of nursing in the state; North Dakota Society for Crippled Children and Adults; Custer District Health Unit; National Registry of Medical Technologists; National Association of Social Workers (medical social work section); American Physical Therapy Association; National League for Nursing; District Nursing Associations; American Dietetics Association; newspapers; and television stations. I'm sure some have been left out of this list.

As state chairman, I have taken the liberty of ordering bulk materials from the national offices of various health careers and distributing them to district presidents, recruitment chairmen, and councillors for the following reasons:

1. A chairman cannot perform unless she is well informed.

2. An appointed chairman may be only mildly interested and not take time to order materials, particularly if she must pay for them. But, if the materials are easily accessible or sent to her, she may develop an intense enthusiasm and become an active participant.

3. With a new program, as many as possible should have information.

I wish to thank all those who have worked with me in giving the Recruitment program a good start in North Dakota.

MRS. E. G. VINJE, Chairman

Scholarships. North Dakota auxiliaries have no individually sponsored scholarships. (None have been reported to me.) Many contribute toward loan funds and scholarships sponsored by individual schools of nursing, hospitals, guilds, and the Easter Seal scholarship and loan program.

We do have a special project in which all auxiliaries participate actively, enthusiastically, and, in fact, almost competitively—The North Dakota student loan fund for medical students. Some auxiliaries have contributed over \$500 a year. The money is raised by style shows, teas, white elephant sales, paper in a poke sales, dinner dances, and so forth.

State scholarships. An expenditure not to exceed \$25,000 was appropriated by the 1957 legislative assembly with the following scholarships approved:

Practical nursing—\$100 to \$150. Covers all costs. Students train at St. Joseph's Hospital, Dickinson, North Dakota, or Wahpeton School of Science.

Professional nursing—\$500 total over a three-year period. Applies at any accredited school of nursing in the state.

Graduate nursing—up to \$1,250 per year. May be used by any qualifying R.N. wishing to enter the administrative or teaching field.

Psychiatry—up to \$7,000 per year stipend for three years. Open to any qualifying M.D. Training to take place at Menninger Institute or other psychiatric center.

North Dakota has one of the most forward-looking mental health programs in the United States today. It follows closely that of the Menninger Institute with a

closed TV circuit from there to our State Hospital for mentally ill at Jamestown.

MRS. E. J. VINJE

Press and Publicity Report

The duties of press and publicity chairman have increased at an overwhelming rate in the past twelve months. They now fall into 3 categories:

1. Editorial, which includes correspondence; reading mail from our national office, editors of other auxiliary publications, allied organizations, our own contributors; then, condensing the material to fit our allotted space.

2. Typing and lay-out work—preparing a composed copy ready for the mimeograph stencil—plus assembling, stapling, folding, and mailing the 5,000 or so mimeographed sheets.

3. Business details, such as keeping the mailing list up-to-date by correspondence with councillors; arranging with the N.D.S.M.A. office for an open date for having mimeographing done; keeping an itemized list of expenditures so that, if necessary, they can be explained at a board or convention meeting; securing authorization for unbudgeted expenses; ordering supplies or copies of each issue to correspond with the size of the current mailing list; hiring or soliciting volunteer help to assemble the *News, Views and Cues*.

Three mimeographed issues of *News, Views and Cues* were sent out in October, December, and February, and a fourth, a printed special anniversary issue, was mailed during the first week in May. This special printed issue is 8 pages in length, in magazine format, with about 5½ pages devoted to pictures, history, graphs, and special anniversary messages. The other 2½ pages contain the usual types of current news. Most of the credit for the anniversary issue belongs to the 6 members of the special committee, appointed at the 1956 board meeting, who assisted the editor. They are: Mrs. C. A. Arneson, Bismarck, state president; Mrs. R. W. McLean, Hillsboro, state treasurer; Mrs. C. D. Gertson, Grand Forks, state historian; Mrs. Marlin Johnson, Bismarck, whose hobby is art; Mrs. W. A. Liebler, Grand Forks, past News Letter editor and present district councillor; Mrs. Clyde Smith, Bismarck, our state legislation chairman, who also has a talent for journalism. No committee ever displayed more interest, efficiency, and teamwork than this talented one!

Advance notices regarding the health career TV program, sponsored by our recruitment committee and presented May 16 by KFYZ television station in Bismarck, were submitted to the newspapers in the Bismarck area.

Our mailing list has fluctuated from the 482, reported a year ago, down to a low of 474, in December 1956, and up to a new high of 484 in April 1957.

I have written 95 or more letters and postcards this year to check the mailing list, procure district news for all issues and material and opinions for the anniversary issue.

Our estimated press and publicity budget has been exceeded for these 6 reasons:

1. The mailing list changes this year far exceeded expectations—changes cost us \$12 apiece.

2. The price of mimeograph paper went up.

3. The N.D.S.M.A. office, because of our husbands' increased work, had to withdraw some assistance, so we had to hire clerical help.

4. The volume of news to be published again increased as more members' and more doctors' deaths were reported, more national and polio news and more mes-

sages from our chairmen were received. This year, for the first time, we also published the names and addresses of district treasurers.

5. For the anniversary issue, the committee decided to use more pictures and more elaborate format than originally planned.

6. An expenditure for mailing envelopes was necessary because of a letter from Dean Harwood, to be enclosed with our last issue, and because many News Letters and magazines coming through the mail are arriving in mutilated condition.

From 6 to 9 districts have sent in news for each issue.

The editorial objective this year was to provide an organ through which state officers and chairmen and the national office could send important messages to all members. Each district was informed of what other districts were doing; happy and sad milestones in the lives of individual members were shared; honors received by individual members were publicized; work was done to further public relations; community health was commended; new officers were introduced; and doctors' wives who were not auxiliary members were informed about auxiliary and urged to join. When space permitted, travel and other personal news items were published.

Our publicity was more costly than anticipated, and it was disappointing to be unable to publish all of the news sent in and some of the interesting material contained in News Letters from other states. However, there are gratifying results of our publicity to report also. Our *News, Views and Cues* has been read with special interest by the auxiliary editors in several other states. Excerpts from Mrs. Arneson's presidential message are quoted in the March 1957 issue of the *New York Distaff*, and, incidentally, Mrs. James Mahoney's speech on Mental Health, prepared for the 1955 Chicago conference, was reprinted in the same issue of the *Distaff*. Excerpts from Mrs. Mahoney's presidential message to us last year were quoted by the Oklahoma editor. Even the editor's doggerel was quoted in the Massachusetts *Bay Stater*. The North Dakota State representative of the National Foundation for Infantile Paralysis commented favorably on our polio publicity and requested a copy of the February 1957 issue. Complimentary letters have been received from some of our members who do not attend meetings.

We seem to need an increased staff or two Board members to handle the present burden of press and publicity duties.

MRS. M. M. HEFFRON, Chairman

Historian's Report

Report of the tenth annual meeting of the Woman's Auxiliary to the North Dakota State Medical Association, which was held jointly with the South Dakota State Medical Association and Auxiliary in Aberdeen, June 4 through 6, 1956, is recorded in detail in the ten year anniversary historian's report and has been placed in the archives of the Woman's Auxiliary. The convention program is in the scrapbook.

Thirty-eight registered from North Dakota. Guest speakers were Mrs. Mason G. Lawson, national president; Dr. Alonzo P. Peeke, president of the South Dakota State Medical Association; Dr. D. J. Halliday, our state president; and Dr. John Freeman, Jamestown.

Mrs. C. A. Arneson presided at the fall board meeting, September 27, 1956, held in the Prince Hotel, Bismarck.

Announcement was made that the auxiliary News Let-

ter has been changed to auxiliary *News, Views and Cues*.

A motion by Mrs. W. A. Liebeler, seconded by Mrs. R. H. Waldschmidt, that the first volume of the scrapbook, the History of the Auxiliary, be placed in safe keeping in the state medical offices and be brought to the state convention by the executive secretary of the state medical association.

In national auxiliary work, Mrs. S. C. Bacheller is serving, for the second year, as area chairman on the committee on legislation of the auxiliary to the American Medical Association.

Our state president, Mrs. C. A. Arneson, presented her paper on Rehabilitation at the Chicago conference. The editor of *Performance*, official publication of President Eisenhower's Committee on the Employment of the Physically Handicapped, heard her talk and procured permission from her and from our national auxiliary executive secretary to reprint her paper in this magazine (January, 1957, issue), which is sent to the governors of all states and to all community committees working for the physically disabled.

Mrs. Arneson's picture was included with a hy-line that she is president of the North Dakota Medical Auxiliary and that the material was presented at the thirteenth annual conference of the Woman's Auxiliary to the American Medical Association, Chicago, October 1-3, 1956.

A 10-year history of the state auxiliary was compiled by your historian and submitted for reference to the committee preparing the special anniversary edition of auxiliary *News, Views and Cues*.

MRS. G. D. GERTSON, Chairman

Ten-Year History of the Woman's Auxiliary to the North Dakota State Medical Association

The North Dakota State Medical Association met in Fargo May 25, 26, and 27, 1947. One of the social events for the women was a luncheon at the El Zagal Club. Mrs. Larson of Fargo was chairman of the meeting, and, after welcoming the ladies present, she introduced the honored guests, Mrs. Leo Schaefer of Salina, Kansas, and Dr. A. E. Spear of Dickinson.

Mrs. Schaefer, second vice president of the Woman's Auxiliary to the American Medical Association, talked about the auxiliary and explained the procedure of organization. North Dakota was then one of very few states that had not formed an auxiliary.

Dr. Spear, acting president of the North Dakota Medical Association, talked along the same lines and urged us to form an auxiliary, hoping that through the women's efforts, the much talked of subject, socialized medicine, might be discussed and the correct information given to all groups wherever the subject might be brought up.

After a short discussion, a motion was then approved and carried that the women of North Dakota organize an auxiliary to the North Dakota State Medical Association. The following officers were elected: Mrs. P. G. Arzt, Jamestown, president; Mrs. W. F. Baillie, Fargo, president-elect; Mrs. H. M. Berg, Bismarck, first vice president; Mrs. Ted Keller, Rugby, second vice-president; Mrs. O. M. Smith, Kildeer, recording secretary; and Mrs. V. G. Borland, Fargo, treasurer.

The officers received much help from Mrs. Schaefer before we left Fargo, and she gave us all material for our work. The first year was spent entirely in organizing, and, at first the executive board meeting held in Jamestown in October, 1947, an advisory committee from the state medical society was appointed to assist

the auxiliary. Committee members were: Dr. P. G. Arzt, Jamestown, chairman; Dr. O. A. Sedlak, Fargo; Dr. E. J. Larson and Dr. Joseph Sorkness, Jamestown; Dr. R. H. Waldschmidt, Bismarck; and Dr. A. D. McCannel, Minot.

We struggled through the first year and when the first annual convention was held in Jamestown in May 22-25, 1948, all districts except Kotana were organized, the last two—Grand Forks and Wahpeton—just in time to report to the convention and become charter members. At the end of our first year, we had a membership of 163 and balance of cash on hand of \$122.25. The auxiliary was helped financially by the North Dakota State Medical Association to make it possible to carry out our plans for the convention and to enable us to entertain our guests. It had been customary for the men to give a sum of money for the ladies' social events which always took place at the state conventions.

When we were organized in Fargo, Mrs. Schaefer said she would come to our first meeting if we organized the state. So, true to her promise, she came to Jamestown and was our guest of honor through the convention and the speaker at the banquet held at the Crippled Children's School. Another guest speaker at this meeting was Mr. Frank E. Smith, director, Associated Medical Care Plans, Chicago. He spoke on the Blue Shield Plan of Medical Care. At this meeting, it was decided to give the president a stipend of \$25 to use towards her travel expenses. The following officers were installed for the ensuing year: Mrs. W. F. Baillie, Fargo, president; Mrs. H. M. Berg, Bismarck, president-elect; Mrs. E. T. Keller, Rugby, first vice-president; Mrs. J. L. Devine, Jr., second vice-president; Mrs. O. M. Smith, Kildeer, recording secretary; and Mrs. V. G. Borland, Fargo, treasurer. Mrs. H. M. Berg was chosen as delegate to the national convention.

The third annual convention was held in Minot, May 15-17, 1949, in the Sky Room of the Clarence Parker Hotel. Mrs. Baillie's message to the members contained very valuable information and advice. I would like to quote from it: "The first need for the auxiliary is to be basically informed of the issues at stake. We must do more than fight fire with fire; we must fight false theories with facts. As public relations ambassadors, our auxiliaries should not solely concentrate on social activities. Nothing could create a poorer impression. Our social service, health, and welfare activities must be stressed rather than the purely social ends."

A budget plan was adopted this year, and the council voted a yearly sum of \$200 for the auxiliary. Also, this year, our News Letter was started, to contain news from all districts.

The president's pin was another accomplishment. All past presidents were eligible to wear it.

A memorial for Mrs. G. W. Williamson was read and a motion was made to have all the memorials placed in the historians file. Mrs. Harold Wahlquist, national president of the woman's auxiliary, was the guest at the convention. The following officers were elected for the year: Mrs. H. M. Berg, Bismarck, president; Mrs. E. T. Keller, Rugby, president-elect; Mrs. V. D. Fergusson, Edgely, first vice-president; Mrs. G. G. Thorgrimsen, Grand Forks, second vice-president; Mrs. J. W. Jansonius, Jamestown, recording secretary; and Mrs. R. W. Rodgers, Dickinson, treasurer.

The fourth annual convention was held in Grand Forks in the Dacotah Room of the Dacotah Hotel. Mrs. H. M. Berg presided. In her report, Mrs. Berg said,

"Our special project this year has been to have each auxiliary in our state emphasize—Every Member An Informed Member—on all phases of compulsory health insurance." Dr. and Mrs. Wright of Williston compiled a very complete paper on Socialized Medicine, which was read to various groups throughout the state. This paper was read at this meeting and greatly enjoyed.

Our national president, Mrs. David B. Allman, was our guest for this convention. A proposal was made that our organization establish a continuing project, and a committee was appointed to serve on this project. The following officers were elected for the coming year: Mrs. E. T. Keller, Rugby, president; Mrs. R. W. Rodgers, Dickinson, president-elect; Mrs. G. G. Thorgrimsen, Grand Forks, first vice-president; Mrs. Henry Kermott, Minot, second vice-president; Mrs. J. W. Jansonius, Jamestown, recording secretary; and Mrs. R. D. Nierling, Jamestown, treasurer.

The fifth annual meeting was held in the new American Legion club room at Bismarck, May 19-22, 1951. At this meeting, the auxiliary report stated that we have a total membership of 227. General George Lull, general manager and secretary of the American Medical Association, gave a short address. The president, Mrs. E. T. Keller, stressed in her report that our district societies should devote more time to discussion of state and national legislative problems.

This was the year that we established the Sophomore Medical Student Loan Fund for the benefit of medical students transferring from the University of North Dakota at the end of their sophomore year. The outline of the project was drawn up with the representatives of the University of North Dakota and endorsed by them and the president of the North Dakota State Medical Association and is known as our "Sophomore Medical Student Loan Fund Project." The amount raised this year for this fund was \$1,047.76. Mrs. Keller was appointed to formally inaugurate the Student Loan Fund.

Mrs. Mason G. Lawson, national third vice-president, was our guest speaker and was unanimously elected to honorary membership in the North Dakota Woman's Auxiliary.

It was moved and carried that all members of the auxiliary be required to register at the convention before being allowed to attend any of the social functions. The following officers were elected: Mrs. R. W. Rodgers, Dickinson, president; Mrs. G. G. Thorgrimsen, Grand Forks, president-elect; Mrs. Henry Kermott, Minot, first vice-president; Mrs. G. W. Toomey, Devils Lake, second vice-president; Mrs. J. W. Jansonius, recording secretary; and Mrs. I. D. Clark, Casselton, treasurer.

The sixth annual meeting was held in Fargo at the Town Hall in the Gardner Hotel, May 1-4, 1952. Mrs. Thorgrimsen was chosen to present \$1,225.67 to the University for our Student Loan Fund project. Mrs. Rodgers presided at this meeting and in her report stated that where you find a worthy project, you also find an auxiliary member working. A civil defense committee was set up to study with local district defense committees and support the project when and where it becomes necessary.

Mr. Lyle A. Limond, the new executive secretary of the North Dakota State Medical Association was introduced.

Mrs. Mason G. Lawson, second national vice-president, was again our honored guest and speaker.

Mrs. Henry Kermott, Minot, was appointed state chair-

man of Rural Health. Each district was to appoint a chairman to assist Mrs. Kermott and the state council on Rural Health. The following officers were elected: Mrs. G. G. Thorgrimsen, Grand Forks, president; Mrs. Henry Kermott, Minot, president-elect; Mrs. S. C. Bacheller, Enderlin, first vice-president; Mrs. J. H. Mahoney, Devils Lake, second vice-president; Mrs. J. W. Jansonius, Jamestown, recording secretary; and Mrs. I. D. Clark, Casselton, treasurer.

The seventh annual meeting was held in Minot, in the Sky Room of the Clarence Parker Hotel, May 9-12, 1953.

A memorial for Mrs. A. W. MacDonald of Valley City, was read.

Our membership now shows a total of 245 members.

The wives of the medical students at the University of North Dakota were organized in November 1952 through assistance of the auxiliary. This organization was called the "Medical Students' Wives Club."

We voted to have a registration fee of \$1.00 at our convention. We also voted to buy a gavel for our auxiliary. Our honored guest and speaker was Mrs. E. A. Underwood, national board of directors, Vancouver, Washington.

An address was given by Mrs. Doris Smith, head of the women's activities committee of the National Foundation for Infantile Paralysis.

The following officers were elected: Mrs. Henry Kermott, Minot, president; Mrs. S. C. Bacheller, Enderlin, president-elect; Mrs. J. H. Mahoney, Devils Lake, first vice-president; Mrs. C. A. Arneson, Bismarck, second vice-president; Mrs. J. W. Jansonius, Jamestown, recording secretary; Mrs. V. J. Fischer, Minot, treasurer.

Mrs. Halliday presented a very interesting scrapbook, which she had prepared, showing the history of the seven years of the auxiliary.

This report is not a complete record of the work that has been done or the many hours spent by many officers and committee members. It is a very short resume as taken from the minutes of the organization. Without the help of Mrs. Jansonius, who has all the records, it would have been impossible for me to give you an account of all the events as they have taken place. I feel very much indebted to Fern, and I am grateful to her for her help, and I thank her for the time and energy she spent for me.

MRS. PHILIP G. ARZT, First President

The eighth annual meeting of the Woman's Auxiliary was held in Grand Forks, May 1-4, 1954. Registration began Saturday, May 1 at the Dacotah Hotel.

The executive board meeting was held Sunday afternoon at the Ryan Hotel, with the president, Mrs. L. H. Kermott, Jr., of Minot, presiding. At 6:30 P.M., the doctors and their wives met at an informal mixer and buffet supper at the country club.

The opening business meeting was held in the auditorium of the University Medical School at 10 A.M., Monday, with Mrs. Kermott presiding. Mrs. R. O. Goehl gave the address of welcome with Mrs. Mahoney responding.

Officers of the auxiliary were: Mrs. Henry Kermott, Minot, president; Mrs. S. C. Bacheller, Enderlin, president-elect; Mrs. J. H. Mahoney, Devils Lake, first vice-president; Mrs. C. A. Arneson, Bismarck, second vice-president; Mrs. J. W. Jansonius, Jamestown, recording secretary; and Mrs. V. J. Fischer, Minot, treasurer.

Mrs. Harry D. Benwell, president-elect of the hostess auxiliary served as convention chairman.

Luncheon was held Monday in the student union. Mrs. R. O. Goehl presided. At the second session at 2:30

P.M., Dr. W. E. G. Lancaster spoke. His topic was "Money." He asked the auxiliary to assist the doctors and spoke of the need for the American Medical Educational Foundation, and urged better support of this organization. Inauguration of A.M.E.F. took place May 3, 1954.

Mrs. Raymond M. Schulte of Spokane, second vice-president of the national auxiliary, was the featured speaker at an informal dinner at 6:30 Monday evening at the Ryan Hotel, at which Mrs. Victor S. Quale presided. At the close, the doctors joined their wives for a dance.

The new officers were installed following a brunch at 10 A.M. Tuesday at the country club, with Mrs. H. D. Benwell presiding.

The ninth meeting took place at Bismarck, April 30-May 3, 1955. Mrs. C. A. Arneson served as convention chairman and was assisted by Mrs. Robert Nuessle, co-chairman for the hostess group.

Registration took place Saturday and Sunday at the Prince Hotel. Doctors and their wives enjoyed an informal mixer Sunday evening at the Bismarck Country Club.

The opening meeting was presided over by Mrs. S. C. Bacheller at the Bismarck Country Club. Mrs. M. M. Heffron, sixth district auxiliary past president welcomed delegates, and Mrs. G. H. Holt, Jamestown, responded. Dr. R. F. Nuessle spoke for the Sixth District Medical Society.

Mrs. C. L. Smith of Bismarck and Mrs. J. H. Mahoney of Devils Lake, president-elect, shared toastmistress duties at a luncheon at 1 P.M. In the absence of Dr. D. J. Halliday, president-elect of the state association, Mrs. Halliday read his speech.

New officers elected Tuesday afternoon were: Mrs. J. H. Mahoney, Devils Lake, president; Mrs. C. A. Arneson, Bismarck, president-elect; Mrs. J. D. Cardy, Grand Forks, first vice-president; Mrs. V. J. Fischer, Minot, second vice-president; Mrs. J. W. Jansonius, Jamestown, recording secretary; and Mrs. A. C. Kohlmeyer, Laramore, treasurer.

The women dined in Convention Hall at the Patterson Hotel. Mrs. H. M. Berg, toastmistress, presented the auxiliary's guest and principal speaker, Mrs. Harlon English of Danville, Illinois, second vice-president of the national organization.

Tuesday, the closing day, wives had brunch at the Apple Creek Country Club where Mrs. Arneson presided. Installation of new officers and social program followed. In the afternoon, there was a tour of the Mandan Refinery.

CLARA M. HALLIDAY, Historian

At the September 29, 1955 fall board meeting, held in Devils Lake with Mrs. J. H. Mahoney, state president, presiding, the first School of Instruction for officers, committee chairmen, and councilors was given by Mrs. C. A. Arneson to better inform all members of their duties and the objectives of the auxiliary, so that every woman in a position of leadership may be more successful in fulfilling her responsibility toward the auxiliary.

CLARA D. GERTSON, Historian, 1956-1957

The tenth annual meeting was held jointly with the South Dakota Auxiliary in conjunction with the Diamond Jubilee Celebration of the South Dakota State Medical Association in Aberdeen, June 2-6, 1956. The seventy-fifth anniversary was a joint meeting of the North and South Dakota State Medical Societies and Auxiliaries. To Mrs. John Rodine, convention chairman; Mrs. Paul C. Bunker,

president of the First District; Mrs. Stephen C. Bacheller; and to all committee chairmen from the hostess district go tributes of praise and appreciation for a very successful convention.

Business meetings of the North Dakota Medical Auxiliary were held separately but it joined the South Dakota Medical Auxiliary for panels, discussions, and social affairs.

Mrs. J. H. Mahoney, president, formally opened the meeting in Room "A," Alonzo Ward Hotel, Monday, June 4, 1956, at 9:00 A.M. Mrs. V. J. Fischer gave the invocation, a prayer by Dr. Peter Marshall. Mrs. Mahoney introduced our honored guest, Mrs. Mason G. Lawson, national president. Later, Mrs. Lawson and Mrs. J. W. Jansonius were presented with gifts from the North Dakota Auxiliary.

Roll call by recording secretary Mrs. Jansonius showed about 38 members present. More than 100 auxiliary members from North and South Dakota met for the informal social hour and staggette at the Alonzo Ward Hotel on Sunday evening, which was a courtesy of the South Dakota State Medical Association.

On Monday, the South Dakota Auxiliary entertained members from North Dakota at the annual luncheon held at the Aberdeen Country Club, honoring the national guest, state officers, chairmen, and past presidents. A style show was very interesting and entertaining. The garments worn by Mrs. Olwin Ackley were awarded as prizes.

Entertainment and cocktails at the Mexican Room of the Sherman Hotel, followed by a banquet with North and South Dakota Medical Associations, completed a very pleasant day. Nearly 400 attended the banquet in the Civic Auditorium.

On Tuesday, the North Dakota Auxiliary was hostess for luncheon at Helen's California Kitchen. Several members of the Bismarck Auxiliary entertained with some humorous musical ditties from a skit called "Tell Me Doctor" paraphrased to fit different branches of the medical profession. Another member gave a clever reading concerning a doctor's wife visiting her psychoanalyst. The incoming presidents, Mrs. C. A. Arneson and Mrs. Wayne Geib of Rapid City, South Dakota, were honored. The drawings for door prizes caused a little excitement when the gals from the "north" were lucky again.

The open house party at the country club included planned entertainment, dancing to orchestral music for those who wished to dance, while others spent the evening visiting or playing cards.

Returning to the business meetings, new officers elected were: Mrs. C. A. Arneson, Bismarck, president; Mrs. J. D. Cardy, Grand Forks, president-elect; Mrs. V. J. Fischer, Minot, first vice-president; Mrs. J. M. Van der Linde, Jamestown, second vice-president; Mrs. J. W. Jansonius, Jamestown, recording secretary; and Mrs. A. C. Kohlmeier, Larimore, treasurer.

Referring to the 1956 October JOURNAL LANCET and convention program notes, principal addresses were given by Mrs. Mason G. Lawson; Dr. Alonzo P. Peeke, president of the South Dakota State Medical Association; Dr. D. J. Halliday, our state president; and Dr. John Freeman, Jamestown, who spoke on Mental Health.

Recorded in the minutes is a copy of Resolutions from the Council and the House of Delegates of the North Dakota State Medical Association showing their appreciation and thanks to the Woman's Auxiliary for their excellent work and vision in their splendid project—The Sophomore Medical Student Loan Fund. The Resolution,

signed by Dr. J. C. Fawcett, chairman of the council, states that approximately \$10,000 has been raised for its purpose, which is of inestimable value to many medical students and to the medical school.

Memorial services were held for Mrs. W. F. Baillie, our second state president, and Mrs. A. A. Kjelland. At the post convention meeting, a motion was made by Mrs. R. W. Rodgers that we contribute a \$25 memorial to A.M.E.F. in memory of Dr. F. Daniel Gillis, president of the South Dakota State Medical Association, who died three days before the convention.

In summarizing the ten-year history of the Woman's Auxiliary to the North Dakota State Medical Association, it is of note that all 10 districts are organized members; membership has grown from 163 to 312 in 1956; state committees have increased from Legislation, Historian, Hygia, and Bulletin in 1947 to 20 in 1957. They are: Organization and Membership, Program, Public Relations, Legislation, Bulletin, Historian, Today's Health, Press and Publicity, Revisions, Rural Health, A.M.E.F., Parliamentarian, Mental Health, Recruitment, S.M.S.L.F., Resolutions, Civil Defense, Nominating, and Safety and will be discussed at the Fargo 1957 convention. The School of Instruction for officers, committee chairmen, and Councilors was initiated in 1955.

A word of thanks and appreciation is due Mrs. Philip G. Arzt, our first president, and Mrs. D. J. Halliday for their historical reports from 1947 through 1955, and for assistance from Mrs. C. A. Arneson, Mrs. M. M. Heffron, Mrs. W. A. Liebeler, and Mr. Lyle A. Limond, who helped make it possible to write this History and bring the Scrapbook and files up-to-date.

CLARA D. GERTSON, historian

"Today's Health" Report, 1956-1957

This report is based on material I have received from the Chicago office plus reports from 6 of the districts. As yet I have not received reports from Traill-Steele, Northwest, Stutsman, and Sheyenne Valley.

District	Quota	Total Subscriptions			Sold to Auxiliary
		New	Renewals	Others	
Devils Lake	19		23		23
Kotana	17	4	16		16
Sixth	57	5	12	1-2 yr.	3
First	61	3			1
Grand Forks	60	20	13	1-4 yr.	37
Southwestern	22		6	1-4 yr.	6
Traill-Steele	12		no report		
Northwest	30		22		
Stutsman	23		5		
Sheyenne Valley	10		no report		
Totals	311	32	97	10	86

Percentage of quota is 45 per cent as compared to 66% per cent last year. Gift subscriptions totalled 22.

The only suggestion I received for achieving 100 per cent of our quota in next years' subscription drive was to include the price of *Today's Health* in our annual dues if our members would agree to it.

MRS. D. F. PILE, chairman

American Medical Education Foundation Report

In October 1956, I contacted all district presidents in the state and asked them to appoint an A.M.E.F. chairman if appointments had not already been made. These names were then sent to the central office and a request made that A.M.E.F. portfolios be sent to them.

In November, I received a supply of A.M.E.F. "Sympathy" and "In Appreciation" cards and immediately mailed 10 of each to each district chairman.

Early in March of 1957, I again contacted the district chairman, asking that a final appeal for funds be made.

As of April 10, 1957, a total of \$323 has been contributed to the A.M.E.F. by private donations and auxiliary contributions.

This total of funds raised during the 1956-1957 campaign has doubled that of the preceding year, and I sincerely hope that it will continue to expand in this manner.

May I take this opportunity to thank all members of this committee for their splendid cooperation in raising funds for this very important Medical Education Foundation.

MRS. R. W. RODGERS, chairman

Medical Student Loan Fund Report

Below is a list of how much each district contributed:

First	\$ 278.00
Kotana	90.00
Northwest (selling paper products)	353.37
Devils Lake (second)	100.00
Sheyenne	15.00
Sixth (fur style show, white elephant sale and tea, individual projects, and coffee parties)	700.00
Southwest	100.00
Stutsman	105.00
Traill-Steele	16.00
Grand Forks (bake sale and dinner dance)	611.06
	\$2,368.43

Adding this year's contribution to money raised since the project's beginning in 1951, we have raised \$12,714.44. \$1,142.42 has been repaid to the loan fund.

At the committee meeting, we decided to propose an amendment to include fourth year medical students and raise the amount of the loan from \$500 to \$1,000.

STELLA H. FRITZELL, chairman

Civil Defense Report

In August 1956, I wrote to our national civil defense chairman to send all information *directly* to each of our 10 district civil defense chairmen to aid them in their programs for the year.

Each chairman was asked to contact each one of her auxiliary members in her district personally and ask if she had or would participate in one or more of the following activities: (1) first aid or home nursing program, (2) stockpiling of supplies in homes, cars, and other locations, and (3) other civil defense activities, such as mass feeding programs, ground observers' course, showing of movies, or speeches.

The national goal was 25 per cent of auxiliary members participating in some category. If a member took part in 3 activities she was counted *three* times. This made it possible for us to exceed 100 per cent.

My report to national was mailed April 1, the deadline, and I then had reports from 5 out of the 10 district chairmen, so *my* report was not too accurate. But I am pleased to report that of the 5 counties reporting, the average was 40 per cent participation.

MRS. R. F. GILLILAND, chairman

Mental Health Report

The combined population of the School for the Mentally Retarded at Grafton and the State Mental Hospital at Jamestown is just under 3,000 patients.

The State Hospital, during the past year, has improved its kitchen and laundry facilities and secured new ward furniture. There has been continued improvement in the psychiatric treatment services. The professional personnel, though not yet meeting the recommendations of the American Psychiatric Association, has been added to, making a total of 23 registered nurses and 6 psychologists, all of whom are Ph.D's. A new Ph.D. internship

in connection with the University of North Dakota has been instituted.

The 1957 legislature, with 2 bills, changed the character of the hospital from an institutional type to a bonafide hospital requiring standards and procedures expected from other North Dakota hospitals. The House Appropriations bill allowed the hospital an added \$.25 per day per patient for a total of \$3.25.

The State School at Grafton is understaffed and the facilities remain inadequate. These physical inadequacies, the lack of qualified professional personnel, and the ineffective training program which may exist are due to a lack of public information rather than a lack of public interest.

Horizons for the mentally ill are brightening. New developments in drugs and therapy have created a climate of hope. Greater attention is being given to the inter-relation of patients and staff in the hospital and the effects of these on the progress of the patient. Professional personnel are finding ways to make the hospital community itself a more effective healing agent.

With much effort, we have created a greater awareness of the problems involved in the successful care and treatment of the mentally ill, but to date we have made but small progress in fostering a more tolerant public attitude toward our mentally ill.

MRS. JOHN VAN DER LINDE, chairman

Annual Report, 1956-1957, State Chairman of Mental Health, Woman's Auxiliary to the American Medical Association

Name of state—North Dakota

Name of state chairman—Mrs. John Van der Linde

Address—1016 - 4th Ave. N.E., Jamestown, North Dakota

1. Have you cleared all projects and your annual program with your advisory committee? Has the advisory committee requested your help in promoting any of its programs?

We received no requests for assistance.

2. Describe your efforts to make a survey of the psychiatric care available for emotionally disturbed and psychotic children in your state? Please include your opinion on whether or not this survey has been completed, and, if not, whether it can be completed next year?

The State Hospital Administration is continuously calling attention to the lack of such facilities as the inpatient psychiatric services for children. The survey, if completed, has not been compiled into a report.

3. Were programs of mental health education carried out in county auxiliary programs? At state convention? Were exhibits used?

With what other organization did the auxiliaries cooperate to carry out community mental health education programs?

4. How widely was Mental Health Week observed in your state? Did the auxiliary play a part in this observance? If so, what part?

We will have two workshops during Mental Health Week. One will be in Minot, dealing with "Children in Adolescence" and one in Valley City on "Chronic Physical Disease." The state hospital will have open house on May 2.

5. Have auxiliaries in your state set up a program of promotion for *Milestones for Marriage*? In answering, please designate which other groups have cooperated in this promotion locally, and what the response to the series has been. Describe any outstanding promotion effort.

The mental health committee approved *Milestones for Marriage* on the state level. Stutsman county has not given a decision, to date, on its use in the county.

6. What legislative activities have been engaged in by your state and county auxiliaries during this past year? Was this a cooperative effort with the legislative committee?

1. Approval by the medical association of the revised mental health legislation.

2. Passage of bill covering stipend training of medical personnel.

7. Describe the volunteer efforts of your county auxiliaries in state and private mental hospitals, child guidance clinics, social service centers, etc. Were the majority of these efforts made by the auxiliaries as a group, or as individuals working in other groups?

Our auxiliaries are not very active as a state group, but we have many groups, especially the Mental Health

Volunteers, who are very active in the state hospital. Evening programs, birthday parties, card parties, and so forth, are given by clubs, church groups, and volunteers.

8. Have your auxiliaries engaged in any activity leading to recruitment of young people for careers in health fields?

Our Future Nurses Club has grown tremendously under the leadership of Mrs. John Young.

9. What use has been made of the materials sent to state chairmen from the national chairman during the past year? Would you suggest more material? If so, what kind?

Because of our limited activities, I have not been able to use this excellent material.

10. What suggestions do you have to improve the effectiveness of the mental health committee and its chairman?

Please fill out this questionnaire in full and return to Mrs. Aaron E. Margulis, 1664 Cerro Gordo, Santa Fe, New Mexico, by May 1, 1957. Send one copy to your state president, and keep one copy for your files.

Safety Report

Safety committees were appointed to our branch auxiliaries during the month of January. Most of our year's program and project planning had been done in the fall, so little can be reported in actual Safety activity for this year. However, something has been accomplished. We have all been alerted to the fact that the Woman's Auxiliary can do something to promote safety education. Suggestions to aid us in this new project are available and we are prepared to give Safety a prominent place in next year's programming.

North Dakota's automobile accident rate ranks well below the nation's average. Recreation facilities, newly created in some parts of our state by the Garrison Reservoir, emphasize a new need for public education in water safety.

Within their membership, few branch auxiliaries have been untouched by the tragedy of accidents in the home or on the highway. Is there anyone of us who would not do everything in our power to prevent accidents to our loved ones and our neighbors?

Let us be guardians of the nation's Safety as our husbands are guardians of the nation's health.

MRS. LORMAN L. HOOPES, chairman

Motion was made by Mrs. S. C. Bacheller that we accept the reports of the state committees. Motion was seconded and carried.

Meeting recessed to reconvene at 2:30 P.M.

A luncheon was served Monday, May 27, at 1:00 P.M. in the Colonial Room, Gardner Hotel. Mrs. J. D. Cardy, state president-elect, and Mrs. Bernard Mazur, First District president-elect, presided. Mrs. J. D. Cardy presented Dr. R. W. Rodgers, president-elect, North Dakota State Medical Association. Dr. Rodgers stated that the society is truly appreciative of the work that our auxiliary is doing and commended us highly on our student loan fund. He emphasized the fact that we were the primary factor in keeping the medical and the lay people on the same level of thought. He said that we had numerous opportunities through our social contacts to correct wrong impressions and that we should be prepared to give the correct answers. He also stressed our power to mold public opinion. He mentioned that our health programs were of extreme value, as well as civil defense, A.M.E.F., and many other programs in which the auxiliary had played an important part. He suggested that each district auxiliary have a joint meeting with the medical society sometime during the year. He congratulated us on our magnificent "ten-year harvest," and pledged the support of the medical society.

Mrs. Mazur then introduced the officers and honored guest.

Mrs. Callahan, representative from the National Foundation for Infantile Paralysis, then presented an award to

the auxiliary for its outstanding services to the March of Dimes.

Mrs. Arneson accepted and thanked Mrs. Callahan for the award.

The convention reconvened at 2:30 P.M., May 27.

The meeting was called to order by Mrs. C. A. Arneson, president.

The following district president's reports were then read:

Auxiliary President's Report—First District

The First District auxiliary has 68 paid members. It held 4 meetings during the year 1956-1957.

Meetings. October 30, 1956—dinner meeting at the Gardner Hotel. Program—film on "Family Counselling" and discussion of need for this community. Narrator was Mrs. Budd Clarke Corbus.

January 30, 1957—luncheon meeting at the F. M. Hotel. Program—book review on "Auntie Mame" by Mrs. Murray Baldwin. Final plans were made for a dessert-style show.

March 7, 1957—luncheon meeting at the F. M. Hotel. Program—guest speaker, Mrs. Charles Arneson, President of the North Dakota Medical Auxiliary. Other guests included Mrs. James Cardy, president-elect of the auxiliary, and Mrs. Robert McLean, auxiliary treasurer.

April 30, 1957—dinner meeting at the Gardner Hotel. No program planned. Final plans to be announced on state medical convention to be held here in Fargo.

Projects for the year 1956-57. In November 1956, several of our members participated in a diabetic survey at the Public Health office.

On February 6, 1957, our annual dessert-style show for the benefit of our Student Loan Fund program was given at the Fargo Elks Club; 465 women attended. The sum of \$278.47 was sent to the loan fund and \$75 to A. M. E. F.

To observe nurse recruitment the week of March 11, a tea was given at Gate City Building tea rooms for junior and senior girls interested in nursing. Tours were made through St. Luke's and St. John's hospitals after the tea.

Many of our members participated in the Heart Sunday Campaign as captains and workers.

MRS. LEE CHRISTOFERSON, president

Auxiliary President's Report—Second District

The auxiliary to the Devils Lake District Medical Society held monthly meetings this year, 1956-1957, with a good attendance at each meeting.

We have 18 members at the present time. Most of our members subscribe to *Today's Health* and the *Bulletin*.

Out of the many projects offered to us this year we have selected just two, namely, Medical Recruitment and the Medical School Student Loan Fund.

The film "Career, Medical Technologist" was shown in 10 towns throughout our district and was received very favorably at each showing.

We contributed \$100 to the Medical Student Loan Fund. This amount was raised by giving a benefit bridge party and a raffle.

We have worked conscientiously on these two projects and have achieved satisfactory results.

Our auxiliary has contributed considerable amounts to the polio and Red Cross funds, and our individual members have been very active in local community projects having to do with the various money raising campaigns related to public health, public safety, and civil defense.

MRS. C. G. JOHNSON, president

Auxiliary President's Report—Third District

The Grand Forks auxiliary has 52 members in good standing.

In March of this year, we were saddened by the death of one of our members, Mrs. Frank Hill, who gave so unselfishly of her time to work for the auxiliary. We will miss her greatly.

We have had four dinner meetings this year. At three of the meetings we had talks from heads of departments of the medical school. The last meeting of the year was social, and we were fortunate to have our state president, Mrs. Charles A. Arneson, with us as well as two representatives of the Medical Students' Wives Club. Mrs. Arneson talked to us on Rehabilitation and the coming state convention.

A total of \$611 was turned over to the Medical Student Loan Fund. This sum was derived from profits of a party held at the Grand Forks Country Club in November, plus a rummage sale held at the Y.M.C.A. in February and miscellaneous contributions to the fund.

Each month one of the auxiliary members offers the use of her home to the campus medical wives group for their meetings.

A number of our members are active in the St. Michael's and Deaconess Hospital auxiliaries. Some are active Red Cross workers, and all members who are able help in the various polio, cancer, and heart drives. This year our Mrs. Sandmeyer is in charge of the Grand Forks Easter Seal Drive, and several auxiliary members have volunteered to help.

Our *Today's Health* chairman has reported 36 subscriptions, while our *Bulletin* Chairman has reported 3 subscriptions.

I am indeed grateful to all the members of this auxiliary for their fine cooperation. We have learned that by some work and some play, much can be accomplished both for the good of the community and for the promotion of happier relations among the medical families.

The following officers were elected for the 1957-1958 year: Mrs. E. L. Grinnell, president; Mrs. Robert C. Turner, vice-president; Mrs. Ralph E. Leigh, secretary; and Mrs. Kenneth E. Fritzell, treasurer.

Mrs. W. C. DAILEY, president

Auxiliary President's Report—Fourth District

Membership in the Northwest District Auxiliary for the current year is 29 members plus 2 honorary members. Three new members were added this year, and 3 previous members were lost through moving. We sustained the loss of a member through death, Mrs. M. W. Garrison in March, 1957.

The auxiliary will have held 6 regular meetings by the close of the business year in April, at which time election of officers will take place. The programs have been varied, including a dramatic reading of Shaw's "Don Juan in Hell" by members of the Minot Community Players; a talk by Miss Sharon Seiffert on her experiences as an exchange student in Germany; an address by our state president, Mrs. Charles Arneson, on auxiliary work; and a talk by Miss Louise Reinhus, faculty member of Minot State Teachers College, on European travels. It is planned that the film on Medical Education will be shown during our April meeting, with the idea that information and education of this nature should begin with our own group. It is hoped that the film will also be shown over our local TV station.

Members have been very active in community projects this year with excellent participation in Mother's Drive on Polio, Heart Fund Drive, American Red Cross Fund

Drive, assistance with preschool clinics, committee leaderships with the disaster programs of Civil Defense and Red Cross. Active participation has also been taken in both girl scout and boy scout programs.

Representatives of our auxiliary served as hostesses during a coffee hour for the North Dakota Society for Crippled Children and Adults at their state convention in September. Members also served as hostesses for the St. Joseph's Hospital guild in December.

Our big project for the year was the Student Loan Fund. Money was raised for this purpose during November by a unique project called "Paper in a Poke." The committee selected 10 useful household paper products and placed them in a large paper sack, the "poke," and prepared approximately 500 of these "pokes." The program for our October meeting was devoted to filling these bags. Each member sold 20 bags, and a total of \$353.37 was raised in this manner. Newspaper publicity and TV appearances of committee members advertised the sale.

The recruitment committee is working on a program to provide each of the 36 high schools in our district with a notebook of current pamphlets and literature on nurses training and specific information on the nurses training schools in the district.

Mrs. SAMUEL E. SHIEA, President

Auxiliary President's Report—Fifth District

As president of the Valley City Auxiliary to the Sheyenne District Medical Society, I would like to submit the following report.

Our group, as such, is quite inactive, and our meetings are mainly social with no planned program. It seems quite difficult, if not impossible, to remain organized with our small membership. We have only 5 members this year and have no prospective members at the present time.

As in past years, our members have taken an active part in community activities, such as the Cancer Drive, Red Cross, March of Dimes, and the Polio Clinics. We have not only helped to solicit for these drives, but have spoken in their behalf in our clubs and church circles to people who have asked our ideas on these subjects.

Through individual donations from our members we were able to send a \$15 check to our special project, the Student Loan Fund.

Other activities of our group include weekly visits with the hospital patients while taking the courtesy cart around the different floors. This project was started a few years ago by the Mercy Hospital auxiliary, and it is a pleasant way for us to be in touch with the hospital, nurses, and patients while, at the same time, the books and magazines the cart contains help brighten the patients long hours in bed.

Some of us are extremely interested in the more recently organized Sheyenne Hospital Auxiliary. This hospital is for the chronically ill and is a comparatively new addition to our city and has patients from all over our state as well as out of state. The auxiliary has assisted patients in writing letters and helped to provide special treats for holidays.

Our state president, Mrs. Gladys Arneson, stopped in Valley City for a brief visit the latter part of March. It was an enjoyable meeting, and we regret very much that we were unable to have all our members present.

Mrs. N. A. MACDONALD, President

Auxiliary President's Report—Sixth District

Sixth District Medical Auxiliary is proud of our gracious state president, Mrs. Charles Arneson, a member of Sixth District! The membership of Sixth District Auxiliary is 60, an increase of 3 over last year.

During the year, 4 dinner meetings were held and the programs were: (1) Rehabilitation by Mrs. Charles Arneson; (2) Tuberculosis and Its Treatment Today by Mr. James Swomley, executive director of North Dakota Tuberculosis Association; (3) Civil Defense, Preparedness by Mr. R. P. Miller, civil defense director for Bismarck; and (4) Election of officers.

A survey of public relations showed that members have supplied leadership in community, county, state, and national campaigns, drives, and projects. A donation was sent to the Open Your Heart Fund at Christmas.

Sample copies of *Today's Health* have been placed in dental offices, hospitals, clinics, city nurse office, barber, and beauty shops in an effort to stimulate interest in the magazine. Members have been urged to use subscriptions as gifts.

We have been kept informed on current legislation and have written letters and contacted our senators and representatives when it has been necessary to do so.

The Recruitment Committee worked with the societies of nurses and the High School Career Night Committee of Bismarck and had booths for medical fields at the Career Night.

Our enthusiastic chairman of civil defense and safety, Mrs. Carl J. Baumgartner, who spends many hours at the Filter Center, has been appointed assistant civil defense administrator. A vital part of our program has been to stress the importance of volunteer workers for civil defense, and "to be prepared." This is the first year for safety, and the work has been done by individuals.

Sixth District was represented at the annual convention of the North Dakota Mental Health Association. We are aware of the work to be done in this field. Members are urged to send gifts for patients at the State Hospital.

A small check was sent to A.M.E.F.

In September, we had a benefit fur style show, tea, and white elephant sale for the Sophomore Medical Student Loan Fund. The newest fall styles were presented by Bakken's of Bismarck, and there was a fur showing narrated by Ed Schlamp, Jr., of Schlamp Furriers of Minneapolis. Mr. Schlamp brought out several "fabulous" fur garments plus many practical fur coats, packets, and stoles. At the December meeting, it was decided to increase the Student Loan Fund by each member having a project of her own. Several coffee parties were given, the guests bringing "change," and besides a pleasant afternoon, the Student Loan Fund grew. During the year, we also received generous checks from members.

We know all districts of the medical auxiliary in North Dakota are grateful to Mrs. Maurice Heffron (a member of Sixth District) for her splendid work as editor of *News, Views and Cues*.

MRS. R. F. NUESSELE, President

Auxiliary President's Report—Seventh District

The Auxiliary to the Stutsman District Medical Society has held 3 meetings during the 1956-1957 year. Our fourth and last meeting will be held April 30, when our election of officers will take place. The Stutsman District Medical Auxiliary has 21 members. Our dues are \$10.00 per year; \$5.00 of this goes to the Student

Loan Fund, which makes \$105.00 sent in at the end of the year.

The first meeting, a dinner meeting, was held October 25 at the Cottage Inn. Mr. E. E. Murphy gave us a most informative talk on Civil Defense in Jamestown and the state of North Dakota.

November 14, the auxiliary and Newcomers Club went to the State Hospital and put on one of their monthly birthday parties for patients. It was a most worthwhile evening. Those who didn't attend furnished cakes.

December 11, our annual Christmas party was held at my home. We filled 3 baskets with food and clothing for needy families (it filled my front porch). I purchased turkeys and fruit with the money we include in our dues and delivered the boxes, bags, and so forth a day before Christmas.

Our next meeting was February 28, and we were privileged to have our able state president, Mrs. Charles A. Arneson, attend. She spoke to us on Public Relations. We enjoyed her speech as well as we enjoyed meeting Gladys and renewing her acquaintance. Dr. Arneson met the Stutsman Medical Society for dinner. Our meeting was held at the Cottage Inn.

Our main project is sponsoring the Future Nurses Club, which has as chairman, Mrs. John Young. The club's 35 members are junior and senior high school girls. They meet twice monthly and spend about three hours on Saturday working between Jamestown Hospital, Trinity Hospital, and the Crippled Children's School. Making tray favors has also been a project. In about a month, we hope to have a uniform for them to wear while working. The girls have taken tours of the State Hospital and Crippled Children's School and heard lectures on Industrial Nursing, Public Health, Dental Nursing, and the care of a handicapped child. Other programs have been planned for future meetings. Meetings continue all through the summer. Miss Mary Weston is the district nurse counsellor for the group and has given of her time and effort at each meeting and helped in providing all the transportation to and from various places. I might add Mrs. Young has done a marvelous job of inspiring the girls and directing the organization.

Our group is also active in community projects, such as the United Fund Drive, Cancer Society, March of Dimes, Easter Seal sales, and as officers and members of both hospital auxiliaries.

MRS. THOMAS E. PEDERSON, president

Auxiliary President's Report—Traill-Steele

The Traill-Steele Medical Auxiliary has shown little growth in number, but great enthusiasm for the auxiliary program. We have 9 members, all of whom are active in community affairs.

Many of the projects outlined by the medical auxiliary have become civic projects. The Community Hospitals of Mayville and Hillsboro have instituted scholarships for student nurses, with the understanding that after three years training in an accredited hospital, the registered nurse will return to work in her home hospital for a year.

Auxiliary members aroused interest in the Traill-Steele Civil Defense Day by phoning local citizens and reminding them of the meeting. The same means was used last fall to get out the vote on Election Day.

Mental Health has received much interest, and we have encouraged our husbands to speak on the subject at homemakers, P.T.A., and women's club meetings. Our husbands have also helped us with our Career Day

programs pertaining to medical education, medical technology, and nursing. We have no fund raising project and will, therefore, make our student loan contributions through donations.

Medical Education Week was recognized by all the members of our district, and we found our friends eager to learn more about a doctor's education when we spoke to our women's groups. We also found that casual conversation over coffee promoted greater understanding in our husbands work, for we, the wives, are the liason officers between the public and our doctors.

We hope as each year goes by that Traill-Steele District will be able to contribute more and more to the auxiliary.

MRS. R. W. McLEAN, President

Auxiliary President's Report—Tenth District

We, of the Southwestern District, have a membership of 23 members. We lost 1 member this year and gained 2. In 1956, there was a vote that we should be a social organization, having dinner together and later a short business and social meeting in one of our homes.

Our yearly dues are \$10 and we are, therefore, able to make a few donations. This year we have given \$100 to the Medical Student Loan Fund and \$15 to A.M.E.F.

Although we have not acted as a group, our doctors' wives have been active in worthwhile community projects. Many of our members took the courses offered by the Ground Observers Corps.

We have a premedic student and his wife and 2 children in our community this winter, and our auxiliary has tried to help them as much as we could. They are from Nygeria, North Africa, and came to our community with nothing. Our members gathered blankets, sheets, dishes, food, and many other articles for them. On Thanksgiving, we gave them a complete Thanksgiving dinner and on Christmas, we presented them with gifts for their children so that their first Christmas here in America will be one I'm sure they will never forget.

I do hope you will be able to join us for our meeting in April.

DOROTHY E. FOSTER, President

Motion was made and seconded that we accept the district presidents' reports. Motion carried.

Mrs. Arneson suggested that the proposed revisions to our constitution be shelved until our fall board meeting in September.

Mrs. Grinnell read the following proposed amendment to the Sophomore Medical Student Loan Fund:

Proposed Amendment to the Sophomore Medical Student Loan Fund

I. Qualifications of Candidates:

A loan may be made to any bona fide student carrying on a full program of undergraduate studies in the second (sophomore) year of the medical curriculum.

The Standing Committee shall consider the following points in making loans to applicants: (1) residence in North Dakota, (2) evidence of financial need, and (3) satisfactory scholastic standing as well as personality and other traits that would allow the candidate to become a suitable doctor.

This committee recommends that it be amended to read: "and third (Junior) year of the medical curriculum."

II. Amount of loans:

Such loans shall be interest free from the date of granting up to the time the student receives his or her degree in medicine and thereafter bear interest at the rate of 2½ per cent for a period of one year (due date of note).

A single loan shall not exceed \$500.

Loans may be made up to an amount which would leave an unencumbered balance of \$25.

This committee recommends that this be amended to read: "A single loan shall not exceed \$1,000."

STELLA H. FRITZELL, Chairman
MARGARET R. CRAVEN

Mrs. Sedlak submitted the following nominating committee report:

Nominating Committee Report

President, Mrs. James D. Cardy, Grand Forks; president-elect, Mrs. V. J. Fischer, Minot; first vice-president, Mrs. John Van der Linde, Jamestown; second vice president, Mrs. Robert F. Gilliland, Dickinson; recording secretary, Mrs. John Jansonius, Jamestown; and treasurer, Mrs. Robert McLean, Hillsboro.

MRS. J. H. MAHONEY, Chairman

Mrs. Arneson then asked for nominations from the floor. As there were none, she declared the above persons duly elected and instructed the secretary to so record this in the minutes. Meeting then adjourned.

Mrs. Cardy then reread the amendment and explained the various phases of it. After lengthy discussion, Mrs. Waldschmidt moved that we adopt this amendment. Motion was seconded and passed.

Mrs. R. McLean then read the following proposed budget for 1957-1958:

Proposed Budget, 1957-1958

Income:			
300 members at \$4.00		\$1,200.00	
State medical contribution toward convention expenses		200.00	
Registration of 75 members at convention		75.00	
		1,475.00	
Less national dues, 300 at \$1.00		300.00	
		1,175.00	\$1,175.00
Proposed expenditures:			
President:			
National convention		\$265.00	
Chicago conference		100.00	
Discretionary fund		100.00	
Miscellaneous fund		25.00	
		490.00	\$ 490.00
President-elect:			
Chicago conference		100.00	
Standing and special committees		60.00	
News Letter		175.00	
Stationery		80.00	
Convention expenses		250.00	
Miscellaneous		20.00	
			\$1,175.00

MRS. R. W. McLEAN, Chairman

MRS. V. J. FISCHER

MRS. R. H. WALDSCHMIDT

MRS. C. J. BAUMGARTNER

Mrs. Fischer reported that the auditing committee had found the books in order as of the convention date, but stated that the books would not be closed until June 30.

Mrs. McLean asked for an audit at each fall board meeting. Mrs. S. C. Bacheller then moved that we accept the proposed budget as read.

The following resolution report was then read:

Resolutions Report

I.

Be it resolved: that this convention of the Woman's Auxiliary to the North Dakota State Medical Association extend to Mrs. C. A. Arneson its thanks and sincere appreciation for the great service which she has rendered to that group.

II.

Be it resolved: that Woman's Auxiliary to the North Dakota State Medical Association express grateful appreciation and thanks to the City of Fargo; to the Medical Society of the First District; to the managers and staffs of the hotels; to members of the press, radio, and television; to Mr. Lyle Limond, executive secretary for the North Dakota State Medical Association; to Mrs. R.

W. Rogers, wife of the incoming president, to Dr. R. H. Waldschmidt, past president; to Mrs. Robert Flanders, Manchester, New Hampshire, national president of the Woman's Auxiliary to the American Medical Association; and to all other groups who have contributed to the success of the convention and to the comfort and entertainment of the delegates.

III.

Be it resolved: that the Woman's Auxiliary to the North Dakota State Medical Association express appreciation for the support and cooperation received from all persons, organizations, and agencies who contributed to the success of its program and that of its states and district auxiliaries during the past year.

Mrs. L. E. WOLD, Chairman

Mrs. Gertson moved that the resolution be adopted. It was seconded and carried.

A delightful banquet was held Monday, May 27, at 6:30 P.M. in the Town Hall of the Gardner Hotel with Mrs. Lee Christoferson, first district president, presiding. Mrs. Christoferson introduced Mrs. Weible, general convention chairman. She then presented the state officers: Mrs. Waldschmidt, Mrs. Robert Flanders, and Mrs. Mazur. Mrs. V. J. Fischcer welcomed our past state presidents and introduced the following: Mrs. Berg (1949-50), instrumental in revising our constitution and By-Laws and, also, as playing a great part in the organization of our auxiliary; Mrs. E. T. Keller (1950-51), praised for her outstanding work in organization and helping to start the Sophomore Medical Student Loan Fund; Mrs. R. W. Rodgers (1951-52), our first state president to serve on a national committee (Regional Program Chairman); Mrs. Thorgrimsen (1952-53), helped to organize the Medical Students' Wives Club in Grand Forks; Mrs. L. Henry Kernott (1953-54), served on the National Bulletin Committee; Mrs. S. C. Bacheller (1945-55), initiated the President's Handbook and was also regional sub-chairman on legislation; Mrs. Arzt, our first president (1947-48), was absent. She did a most commendable job in organizing our first districts. Mrs. Baillie (1948-49) is our only deceased past state president. Mrs. Mahoney (1955-56) presided at Aberdeen, South Dakota, in the joint convention commemorating South Dakota's seventy-fifth anniversary.

Mrs. Bacheller announced that a Past President's Club had been organized.

Mrs. Arneson introduced our honored guest and speaker, Mrs. Robert Flanders of Manchester, New Hampshire, national president of the Woman's Auxiliary to the American Medical Association. Mrs. Flanders started her speech by telling us there were 76,000 auxiliary members and praising our auxiliary work even though we were one of the youngest auxiliaries. Her theme was "Health is our greatest heritage." She stated that it had been through the auxiliary work that the truth of that concept had been taken so ably to every community. She stressed the fact that every doctor's wife has to carry on this work and that it was a responsibility of which we could be proud. She stated that our programs had proved their worth and they must all be continued with increased vigor. She supported the belief that the public had learned to depend on us and to seek our guidance—"we have their faith; we must not lose ours." She mentioned that our participation in community health needs had been our great contribution and that the task would become greater as the country grew. She gave us two very good ways of

strengthening our knowledge—reading the *Bulletin* and *Today's Health*. She stressed making every doctor's wife a member and also appealed for a continuance of raising money for A.M.E.F. She suggested wider use of the "In Memoriam" cards and stated how valuable it would be if each member would just send in \$5.00. She said that civil defense programs must be emphasized and that mental health was a primary problem and that we must conduct a campaign to alert the people to its seriousness. She stated that we must watch the bills in congress and be able to know which to support and which to oppose. She stressed the fact that our role as an auxiliary is to practice preventive medicine and that accidental deaths must be prevented. She suggested that each auxiliary select a project that was most needed in the particular community. She emphasized broadening our recruitment program. She stressed our importance as a spokesman for public relations and that even though we have a double duty to perform, we must take an active leadership in health and aid the medical association in whatever way we can.

"We must live to enjoy and enjoy to live."

A very delightful program of vocal and piano numbers was presented.

Mrs. Christopherson then presented Mrs. Flanders, our honored guest, with a gift from the auxiliary.

Postconvention Minutes

Mrs. J. D. Cardy called the meeting to order. She suggested that our revisions to the constitution be worked out by our revisions chairman. Much discussion ensued about our Finance Committee, and Mrs. Bacheller made a motion that we recommend that paragraph C, section 8 be deleted from our constitution. Motion was carried.

It was also suggested that we have a business manager in addition to the editor for our *News, Views and Cues*.

The following were appointed to serve on the Nominating Committee: Mrs. Swanson, Mrs. Sorkness, and Mrs. Gammel.

Mrs. Cardy discussed the role of a corresponding secretary.

The following is a list of officers, committee chairmen, student loan fund committee, district presidents, and district councillors for 1957-1958.

State Officers

President—Mrs. James D. Cardy,
1110 Reeves Drive, Grand Forks
President-elect—Mrs. V. J. Fischer,
707 3rd St., S. E., Minot
First vice-president—Mrs. J. M. Van der Linde,
1016 4th Ave. N. E., Jamestown
Second vice-president—Mrs. R. F. Gilliland,
228 9th St. W., Dickinson
Recording secretary—Mrs. J. W. Jansonius,
609 4th Ave. S. E., Jamestown
Treasurer—Mrs. R. W. McLean, Hillsboro

State Committee Chairmen

Organization and Membership—Mrs. V. J. Fischcer
707 3rd St. S. E., Minot
Program—Mrs. J. W. Van der Linde,
1016 4th Ave. N. E., Jamestown
Civil defense—Mrs. R. F. Gilliland,
228 9th St. W., Dickinson
Nominating—Mrs. C. A. Arneson,
714 2nd St., Bismarck
Press and publicity—Mrs. M. M. Heffron
(manager and chairman), 320 Ave. B W., Bismarck;
Mrs. Robert Hankins (editor), Mott

Public relations—Mrs. Thomas Longuire,
810 6th St., Devils Lake

Legislation—Mrs. Clyde L. Smith,
622 Raymond St., Bismarck

Bulletin—Mrs. Henry Kermott, Jr.,
200 7th Ave. S. E., Minot

Historian—Mrs. G. D. Gertson,
511 S. 5th St., Grand Forks

A.M.E.F.—Mrs. R. W. Rodgers,
146 W. 6th St., Dickinson

Parliamentarian—Mrs. S. C. Baeheller, Enderlin

Mental health—Mrs. Samuel S. Shea,
808 1st St. S. E., Minot

Nurse recruitment—Mrs. Edmond Vinge, Hazen

Rural health—Mrs. Keith J. Vandergon, Portland

Revisions—Mrs. George Holt,
214 2nd Ave. S. W., Jamestown

Safety—Mrs. L. L. Hoopes,
118 9th Ave. S. E., Minot

Today's Health—Mrs. Neville Turner, La Moure

Resolutions—Mrs. James H. Mahoney,
803 6th St., Devils Lake

Medical Student Loan Fund—Mrs. Joseph D. Craven
(chairman), 915 2nd Ave. W., Williston; Mrs. B. A.
Mazur, 1237 N. 3rd St., Fargo; Mrs. J. A. Sandmeyer,
1005 Lanark, Grand Forks; and Mrs. Gale R. Richard-
son, 12 10th St. S. W., Minot

District Presidents and Councillors

First District—President, Mrs. Lee Christoferson, 1307
S. 6th St., Fargo; Councillor, Mrs. Douglas Lindsay,
1505 S. 11 St., Fargo

Devils Lake District—President, Mrs. Milton Gilchrist,
Rolla; Councillor, Mrs. Thomas Longmire, 810 6th
St., Devils Lake

Grand Forks District—President, Mrs. E. L. Grinnell,
1207 Lincoln Drive, Grand Forks; Councillor, Mrs.
P. H. Woutat, 1205 Lincoln Drive, Grand Forks

Sixth District—President, Mrs. R. F. Nuessle, 815 Grif-
fin, Bismarck; Councillor, Mrs. O. M. DeMouly,
Flasher

Stutsman District—President, Mrs. John Van der Linde,
1016 4th Ave. S. W., Jamestown; Councillor, Mrs. G.
H. Holt, 214 2nd Ave. N. E., Jamestown

Traill-Steele District—President, Mrs. R. W. McLean,
Hillsboro; Councillor, Mrs. Keith Vandergon, Portland

Southwestern District—President, Mrs. Donald Reichart,
1019 5th Ave. W., Dickinson; Councillor, Mrs. R. W.
Rodgers, 146 W. 6th, Dickinson

Northwest District—President, Mrs. Oliver S. Uthus, 703
4th St. S. E., Minot; Councillor, Mrs. Henry Kermott,
200 7th Ave. S. E., Minot

Sheyenne Valley District—President, Mrs. Neil Mae-
donald, 711 5th Ave. N. W., Valley City; Councillor,
Mrs. Gunder Christianson, 117 N. W. 3rd St., Valley
City

Kotana District—President, Mrs. Gordon Ellis, 602 14th
Ave. W., Williston; Councillor, Mrs. E. J. Hagan,
904 2nd Ave. E., Williston

1957 MEMBERSHIP ROSTER

WOMAN'S AUXILIARY TO THE NORTH DAKOTA STATE MEDICAL ASSOCIATION

N is new member; W is widow.

DEVILS LAKE DISTRICT

Bryant, Mrs. Emmet Philip . . . 313 6th St., Devils Lake
 Corbett, Mrs. Connor Algernon . . . 316 7th St., Devils Lake
 Fawcett, Mrs. John Crozier . . . 1125 5th St., Devils Lake
 Fawcett, Mrs. Robert M. 719 4th St., Devils Lake
 Fox, Mrs. William Richard . . . 315 Foster Ave. S., Rugby
 Gilchrist, Mrs. Milton Roy Rolla
 Hiltz, Mrs. George Henry Cando
 Johnson, Mrs. Christian G. Rugby
 Keller, Mrs. Emil Theodore Rugby
 Lazareck, Mrs. Isadore Luke . . . 1032 5th St., Devils Lake
 Longmire, Mrs. Lemuel T. 810 6th St., Devils Lake
 Mahoney, Mrs. James Henry . . . 803 6th St., Devils Lake
 Pine, Mrs. Luis Fabien 817 7th St., Devils Lake
 Terlecki, Mrs. Jaroslaw Minnewaukan
 Thordarson, Mrs. John D. Maddock
 Toomey, Mrs. Glen William Devils Lake
 McBane, Mrs. Robert Donald (N) Towner
 Vigeland, Mrs. George Norman Rugby

KOTANA DISTRICT

Borrud, Mrs. Chester C. 607 13th Ave. W., Williston
 Craven, Mrs. John P. 403 3rd Ave. S., Williston
 Craven, Mrs. Joseph D. 915 2nd Ave. E., Williston
 Ellis, Mrs. Gordon E. 602 14th Ave. W., Williston
 Fennell, Mrs. W. Loren Crosby Clinic, Crosby
 Hagan, Mrs. Edward J. 904 2nd Ave. E., Williston
 Hagan, Mrs. Joan C. (N) 410 2nd Ave. E., Williston
 Johnson, Mrs. Alan K. 1004 4th Ave. E., Williston
 Keller, Mrs. John M. 910 4th Ave. E., Williston
 Korwin, Mrs. Justin J. 701 2nd Ave. E., Williston
 Lund, Mrs. Carroll M. 701 1st Ave. E., Williston
 McPhail, Mrs. Clayton O. Crosby Clinic, Crosby
 Pilc, Mrs. Duane F. Crosby Clinic, Crosby
 Sathe, Mrs. Andrew G. 1205 6th Ave. E., Williston
 Skjei, Mrs. Donald E. 803 1st Ave. W., Williston
 Strinden, Mrs. Dean R. 1209 1st Ave. E., Williston
 Walker, Mrs. H. Charles (N) 1709 Hillside Court, Williston
 Wright, Mrs. Willard A. 822 2nd Ave. E., Williston

SHEYENNE VALLEY DISTRICT

Christian, Mrs. Gunder Valley City
 Meredith, Mrs. C. J. (N) Valley City
 Merrett, Mrs. J. P. Valley City
 Macdonald, Mrs. A. C. Valley City
 Macdonald, Mrs. N. A. Valley City

FIRST DISTRICT

Amidon, Mrs. B. F. 1325 6th Ave. S., Fargo
 Armstrong, Mrs. W. B. 1248 N. 9th St., Fargo
 Barnard, Mrs. Donald 1111 S. 7th St., Fargo
 Bacheller, Mrs. S. C. Enderlin
 Beithon, Mrs. E. J. Wahpeton
 Bond, Mrs. J. H. (W) 516 S. 13th St., Fargo
 Borland, Mrs. V. G. 1514 S. 9th St., Fargo
 Burton, Mrs. P. H. (W) 415 S. 8th St., Fargo
 Christoferson, Mrs. Lee 1307 S. 6th St., Fargo
 Corbus, Mrs. B. C. 1257 N. 4th St., Fargo
 Darrow, Mrs. K. E. 716 S. 8th St., Fargo
 DeCesare, Mrs. F. A. 1401 S. 9th St., Fargo
 Dillard, Mrs. J. R. 620 S. 8th St., Fargo
 Donat, Mrs. G. M. 1109 S. 9th St., Fargo
 Fercho, Mrs. Calvin (N) 1502 S. 10th St., Fargo
 Fjelde, Mrs. J. H. (W) 1526 S. 8th St., Fargo
 Fortin, Mrs. H. J. (W) 1440 S. 8th St., Fargo

Fortney, Mrs. A. C. 1505 S. 12th St., Fargo
 Geib, Mrs. Marvin J. 403 S. 8th St., Moorhead, Minn.
 Gillam, Mrs. J. S. 1433 S. 7th St., Fargo
 Goff, Mrs. John R. (N) 1441 S. 8th St., Fargo
 Goltz, Mrs. Neill F. (N) 802 S. 8th St., Fargo
 Gronvold, Mrs. E. O. (Deceased) . . . 910 Broadway, Fargo
 Gustafson, Mrs. Maynard 1410 S. 5th St., Fargo
 Hall, Mrs. G. H. 1748 S. 9th St., Fargo
 Hanna, Mrs. J. F. (W) 907 12th Ave. S., Fargo
 Hawn, Mrs. Hugh W. 1325 N. 1st St., Fargo
 Heilman, Mrs. Charles 49 18th Ave. N., Fargo
 Houghton, Mrs. J. F. 1707 S. 9th St., Fargo
 Hunter, Mrs. C. M. 1434 S. 6th St., Fargo
 Irvine, Mrs. V. S. Lidgerwood
 Ivers, Mrs. G. U. 1106 S. 10th St., Fargo
 Jaehning, Mrs. David Wahpeton
 James, Mrs. J. B. (W) 1145 N. 10th St., Fargo
 Kiesel, Mrs. Ilmar O. Page
 Klein, Mrs. A. L. 1441 S. 9th St., Fargo
 Lancaster, Mrs. W. E. G. 1332 N. 5th St., Fargo
 Landa, Mrs. Marshall 1335 S. 6th St., Fargo
 Larson, Mrs. G. A. 1538 S. 9th St., Fargo
 LeBien, Mrs. Wayne 1353 N. 5th St., Fargo
 LeMar, Mrs. John D. 1324 N. 5th St., Fargo
 Lewis, Mrs. A. K. Lisbon
 Lewis, Mrs. T. H. 1502 S. 6th St., Fargo
 Lindsay, Mrs. D. T. (N) 1505 S. 6th St., Fargo
 Long, Mrs. W. H. 1438 S. 8th St., Fargo
 Lytel, Mrs. F. T. 1301 Broadway, Fargo
 Macaulay, Mrs. W. L. 1410 S. 9th St., Fargo
 Mazur, Mrs. B. A. 1237 N. 3rd St., Fargo
 Melton, Mrs. F. M. 1545 S. 6th St., Fargo
 Nichols, Mrs. Arthur A. (W) 358 S. 6th St., Fargo
 Norum, Mrs. H. A. 1533 S. 6th St., Fargo
 Poindexter, Mrs. M. H. 1350 S. 9th St., Fargo
 Pray, Mrs. L. G. 1701 S. 8th St., Fargo
 Rogers, Mrs. R. G. 1217 S. 7th St., Fargo
 Schleinitz, Mrs. F. B. Hankinson
 Sedlak, Mrs. O. A. 1019 S. 9th St., Fargo
 Shook, Mrs. Lester D. (N) 1755 S. 10th St., Fargo
 Stafne, Mrs. W. A. 1409 S. 9th St., Fargo
 Story, Mrs. Robert 1315 S. 9th St., Fargo
 Swanson, Mrs. J. C. 1220 S. 8th St., Fargo
 Thompson, Mrs. George 421 S. 14th St., Fargo
 Triggs, Mrs. Perry O. 1401 S. 12th St., Fargo
 Urenn, Mrs. B. M. 1005 S. 9th St., Fargo
 Veitch, Mrs. Abner Lisbon
 Webster, Mrs. W. O. 823 S. 14th Ave., Fargo
 Weible, Mrs. R. D. 1628 S. 9th St., Fargo
 Weible, Mrs. R. E. (W) 1630 S. 9th St., Fargo
 Wold, Mrs. L. E. 1708 S. 9th St., Fargo
 Zauner, Mrs. R. J. 1005 N. 13th Ave., Fargo

GRAND FORKS DISTRICT

Arneson, Mrs. A. O. (W) 419½ S. St., Grand Forks
 Benson, Mrs. Theodore Q. 1524 Walnut, Grand Forks
 Benwell, Mrs. Harry D. 625 S. 3rd St., Grand Forks
 Berger, Mrs. Phillip R. 505 N. 25th St., Grand Forks
 Boynton, Mrs. Bruce Grafton
 Campbell, Mrs. R. D. 323 S. 6th St., Grand Forks
 Cardy, Mrs. James E. 1110 Reeves Drive, Grand Forks
 Clayburg, Mrs. B. J. (N) 729 Reeves Drive, Grand Forks
 Countryman, Mrs. G. L. Grafton

Culmer, Mrs. A. E., Jr. 101 Reeves Court, Grand Forks
 Dailey, Mrs. Walter C. 1814 Belmont Rd., Grand Forks
 DeLano, Mrs. Robert Northwood
 Flaten, Mrs. A. N. Edinburg
 Fritzell, Mrs. Kenneth E. (N)

1125 Reeves Drive, Grand Forks
 Gertson, Mrs. G. D. (W) 511 S. 5th St., Grand Forks
 Gochl, Mrs. Reinhold O.

1015 Reeves Drive, Grand Forks
 Graham, Mrs. Charles N.

923 Almonte Ave., Grand Forks
 Graham, Mrs. John H. 1523 Cottonwood, Grand Forks
 Grinnell, Mrs. Ernest L.

1207 Lincoln Drive, Grand Forks
 Harwood, Mrs. Theodore H.

Belmont Road, Grand Forks
 Haugen, Mrs. C. O. Larimore
 Haunz, Mrs. Edwin A.

1029 Lincoln Drive, Grand Forks
 Hill, Mrs. Frank A. (Deceased)

812 Letnes Drive, Grand Forks
 Hofto, Mrs. J. M. (W) 321 N. 4th St., Grand Forks
 Jensen, Mrs. August F. 1721 Belmont Rd., Grand Forks
 Landry, Mrs. L. H. Walhalla
 Leibler, Mrs. W. A. (W)

504½ Reeves Drive, Grand Forks
 Leigh, Mrs. J. A.

606 N. 3rd St., East Grand Forks, Minn.
 Leigh, Mrs. Ralph E. 301 Park Ave., Grand Forks
 Lommen, Mrs. C. E. Fordville

McLeod, Mrs. John 911 N. 22nd St., Grand Forks
 Mahowald, Mrs. Ralph E. 606 S. 5th St., Grand Forks
 Moore, Mrs. John H. 1114 Reeves Drive, Grand Forks

Muus, Mrs. O. Harold 59 4th Ave. S., Grand Forks
 Nelson, Mrs. Wallace 511 17th Ave. S., Grand Forks
 Painter, Mrs. Robert C. 1121 Belmont Rd., Grand Forks

Panek, Mrs. A. F. Milton
 Pettit, Mrs. Sam 625 Reeves Drive, Grand Forks
 Porter, Mrs. Charles B. 1210 Chestnut St., Grand Forks

Potter, Mrs. W. F. 2024 2nd Ave. N., Grand Forks
 Powers, Mrs. W. T. (N) 1210½ Oak St., Grand Forks
 Prochaska, Mrs. L. J. 620 Reeves Drive, Grand Forks

Revere, Mrs. Jack W. 821 Letnes Drive, Grand Forks
 Ruud, Mrs. John E. 2001 Chestnut Ave., Grand Forks
 Sandmeyer, Mrs. John A.

1005 Lanark Ave., Grand Forks
 Silverman, Mrs. Louis B. 626 Belmont Rd., Grand Forks
 Stratte, Mrs. Joseph J. (W)

109 4th Ave. S., Grand Forks
 Strom, Mrs. Adrian D. 2201 7th Ave. N., Grand Forks
 Thorgriksen, Mrs. G. G.

1215 Lincoln Drive, Grand Forks
 Turner, Mrs. Robert C.

1120 Cottonwood St., Grand Forks
 Waldron, Mrs. Mildred (W)

403 Division Ave., Grand Forks
 Witherstine, Mrs. William 214 8th Ave., Grand Forks
 Woutat, Mrs. Phillip H.

1205 Lincoln Drive, Grand Forks
 Youngs, Mrs. Nelson A.

511 Reeves Drive, Grand Forks

NORTHWEST DISTRICT

Amstutz, Mrs. Kenneth N. 505 9th Ave. S. E., Minot
 Breslich, Mrs. Paul J. 818 4th St. S. E., Minot
 Cameron, Mrs. Angus L. 318 8th Ave. S. E., Minot
 Clark, Mrs. Joseph H. 5th St. S. E., Minot
 Devine, Mrs. John L. 7 Airview, Minot

Fischer, Mrs. Verrill H. 8th Ave. S. E., Minot
 Gammell, Mrs. Robert T. Kenmare
 Garrison, Mrs. Mahlon (Deceased)

621 Mt. Curve S. E., Minot
 Goodman, Mrs. Robert Powers Lake
 Halliday, Mrs. David J. Kenmare

Hart, Mrs. George M. 213 7th Ave. S. E., Minot
 Hoopes, Mrs. Lorman L. 118 9th Ave. S. E., Minot
 Hordinsky, Mrs. B. Z. Drake

Huntley, Mrs. Wellington B., Jr.
 208 7th Ave. S. E., Minot

Hurly, Mrs. William C. 6 9th St. S. E., Minot
 Kermott, Mrs. H. L., Jr. 200 7th Ave. S. E., Minot
 Kitto, Mrs. William 1021 Central Ave. W., Minot

Kohl, Mrs. Darwin L. (N) 8th Ave. S. E., Minot
 London, Mrs. Carl B. 506 Main St. S., Minot
 Naegeli, Mrs. Frank D. 920 3rd Ave. N. W., Minot

Richardson, Mrs. Gale R. 12 10th St. S. W., Minot
 Seiffert, Mrs. G. S. Rural Minot
 Shea, Mrs. Samuel E. 808 1st St. S. E., Minot

Sorenson, Mrs. Alfred R. 114 6th St. S. E., Minot
 Vaaler, Mrs. Raymond A. (N)

1711 6th St. S. W., Minot

SOUTHWEST DISTRICT

Bowen, Mrs. Jessie (W) 221 7th Ave. W., Dickinson
 Buckingham, Mrs. William Elgin
 Bush, Mrs. C. A. Beach

Curiskis, Mrs. A. A. Elgin
 Dukart, Mrs. C. R. 208 4th Ave. W., Dickinson
 Dukart, Mrs. Ralph 443 1st Ave. E., Dickinson

Foster, Mrs. Keith 5 E. 2nd St., Dickinson
 Gilliland, Mrs. Robert 446 1st Ave. W., Dickinson
 Guloien, Mrs. Hans. 41 5th Ave. W., Dickinson

Gumper, Mrs. A. J. 7 E. 4th St., Dickinson
 Hanewald, Mrs. Walter Richardton
 Hankins, Mrs. Robert Mott

Hill, Mrs. Simon Regent
 Larsen, Mrs. Harlan 1005 5th Ave. W., Dickinson
 Moses, Mrs. James Richardton

Nachtwey, Mrs. A. P. (W) 115 5th Ave. W., Dickinson
 Ordahl, Mrs. Norman (N) Box 805, Dickinson
 Raasch, Mrs. Richard 30 W. 8th St., Dickinson

Reichert, Mrs. Donald 1019 5th Ave. W., Dickinson
 Reichert, Mrs. Larry 543 1st Ave. W., Dickinson
 Rodgers, Mrs. Reginald 146 W. 6th St., Dickinson

Spear, Mrs. A. E. 610 1st Ave. W., Dickinson
 Smith, Mrs. Oscar 509 1st Ave. W., Dickinson

SIXTH DISTRICT

Anderson, Mrs. F. E. (N) Underwood
 Arneson, Mrs. Charles A. 714 2nd St., Bismarck
 Baumgartner, Mrs. Carl J.

615 N. Washington St., Bismarck
 Berg, Mrs. H. Milton 214 Ave. A West, Bismarck
 Bertheau, Mrs. J. H. Linton

Boerth, Mrs. Edwin H. 825 Griffin St., Bismarck
 Boyle, Mrs. John (N) Garrison
 Brink, Mrs. Norvel O. 212 Ave. F West, Bismarck

Buckingham, Mrs. Tracy W. 1030 5th St., Bismarck
 Cartwright, Mrs. John T.

1110 S. Highland Acres, Bismarck
 Cleary, Mrs. Joseph W. 1121 First St., Bismarck
 Dahl, Mrs. Phillip O. 1111 S. Highland Acres, Bismarck

DeMouilly, Mrs. Oliver (W) Flasher
 Diven, Mrs. Wilbur 119 Ave. B West, Bismarck
 Eriksen, Mrs. Johan 815 Ave. C West, Bismarck

Freise, Mrs. Paul W. 831 Mandan St. N., Bismarck
 Froeschle, Mrs. Rudolph P. Hazen
 Gaebel, Mrs. O. C. New Salem

Girard, Mrs. B. A. Beulah
 Goughnour, Mrs. Myron. . . 1310 N. 2nd St., Bismarck
 Gregware, Mrs. P. Roy. . . . 1107 S. Highland Acres, Bismarck
 Gutowski, Mrs. Franz. Wishek
 Harrington, Mrs. James. . . 710 4th Ave. N. W., Mandan
 Heffron, Mrs. M. M. 320 Ave. B West, Bismarck
 Henderson, Mrs. R. W. 1028 N. 4th St., Bismarck
 Hetzler, Mrs. A. E. 602 6th Ave. N. W., Mandan
 Icenogle, Mrs. Grover D. . . 608 W. Thayer St., Bismarck
 Jacobson, Mrs. Melvin S. Elgin
 Johnson, Mrs. Kenneth. . . 211 Cheyenne Ave., Bismarck
 Johnson, Mrs. Marlin J. E. . . 1020 Washington St., Bismarck
 Johnson, Mrs. Paul L. 224 Ave. A West, Bismarck
 Kalnins, Mrs. Arnold. Washburn
 Kling, Mrs. Robert R. 1414 Hannaford, Bismarck
 Kuplis, Mrs. Harold. Turtle Lake
 Larson, Mrs. Leonard W. . . 219 Ave. B West, Bismarck
 Lindelow, Mrs. O. Victor. . 831 Crescent Ave., Bismarck
 Lipp, Mrs. George R. (N) . . . 502 W. Rosser Ave., Bismarck
 Lommen, Mrs. M. A. K. . . . 107 10th Ave. N. W., Mandan
 Montz, Mrs. C. R. 315 E. Park Ave., Bismarck
 Nuessle, Mrs. Robert F. . . . 815 Griffin Ave., Bismarck
 Oja, Mrs. Karl. Ashley
 Orchard, Mrs. Welland J. (N) . . . Linton
 Orr, Mrs. August C. 922 N. 9th St., Bismarck
 Owens, Mrs. Percy L. 1314 N. 4th St., Bismarck
 Perrin, Mrs. E. D. 520 Ave. A West, Bismarck
 Peters, Mrs. Clifford. 805 N. Griffin, Bismarck
 Pierce, Mrs. Willard B. . . . 911 Ave. C West, Bismarck
 Ramstad, Mrs. N. Oliver (W) . 824 N. 4th St., Bismarck
 Schoregge, Mrs. Charles W. (N) . . 221 N. 5th St., Bismarck
 Schoregge, Mrs. Robert D. . . 1420 Ave. E., Bismarck
 Smeenk, Mrs. H. P. (N) . . 1107 Ave. A East, Bismarck
 Smith, Mrs. Clyde L. 622 Raymond, Bismarck
 Thompson, Mrs. Arnold . . . 610 Ave. A East, Bismarck
 Tudor, Mrs. Robert B. . . . 714 Ave. C West, Bismarck
 Vinje, Mrs. Edmund G. Hazen
 Vonnegut, Mrs. Felix F. Linton
 Waldschmidt, Mrs. Reuben H. . . . 600 N. Washington, Bismarck
 Walters, Mrs. Paul (N) Hazen
 Wittchow, Mrs. Allen W. . . 1413 N. 12th St., Bismarck
 Zukowsky, Mrs. Anthony. Steele

STUTSMAN DISTRICT

Arzt, Mrs. P. G. 502 4th Ave. S. E., Jamestown
 Beall, Mrs. John A. 501 2nd Ave. N. E., Jamestown
 Elsworth, Mrs. John N. . . 605 5th St. N. E., Jamestown
 Freeman, Mrs. John. State Hospital, Jamestown
 Hewitt, Mrs. John M. (N) . . . 717 5th St. N. E., Jamestown
 Hogan, Mrs. C. W. 316 4th Ave. N. E., Jamestown
 Holt, Mrs. George (W) . . . 214 2nd Ave. S. E., Jamestown
 Jansonius, Mrs. John W. . . 609 4th Ave. S. E., Jamestown
 Larson, Mrs. Ernest J. . . . 321 2nd Ave. S. E., Jamestown
 Lucy, Mrs. Robert L. 420 4th Ave. S. W., Jamestown
 McFadden, Mrs. Robert L. . . . 910 3rd Ave. N. W., Jamestown
 Nierling, Mrs. Richard D. . 415 9th St. S. E., Jamestown
 Pederson, Mrs. Thomas E. . . . 416 4th Ave. N. E., Jamestown
 Robertson, Mrs. C. W. (W) . . . 106 6th St. N. W., Jamestown
 Saxvik, Mrs. Russell O. State Hospital, Jamestown
 Sorkness, Mrs. Joseph. . . . 318 3rd Ave. S. E., Jamestown
 Swenson, Mrs. John A. . . 240 12th Ave. N. E., Jamestown
 Tripp, Mrs. Harry (N) State Hospital, Jamestown
 Van der Linde, Mrs. John . . . 1016 4th Ave. N. E., Jamestown
 Woodward, Mrs. Robert S. . . . 310 10th Ave. N. E., Jamestown
 Young, Mrs. John. State Hospital, Jamestown

TRAILL-STEELE

Chase, Mrs. Gilman L. (N-W) Mayville
 Knudson, Mrs. A. A. (W) Buxton
 LaFleur, Mrs. Harold A. Mayville
 Little, Mrs. Roy C. Mayville
 McLean, Mrs. R. W. Hillsboro
 Mergens, Mrs. D. N. Hillsboro
 Rosenberg, Mrs. Mervin Hatton
 Vandergon, Mrs. Keith Gordon Portland
 Vinje, Mrs. Syver (W) Hillsboro

 301 members
 1 honorary member, Mrs. Mason G. Lawson, 200
 Ridgeway, Little Rock, Ark.

Comments concerning this Section, criticisms, or suggestions for papers will be most welcome. Physicians are cordially invited to submit articles pertaining to pain for consideration. All inquiries and manuscripts should be sent to Dr. John S. Lundy, 102 Second Avenue Southwest, Rochester, Minnesota, or to the Editorial Department, THE JOURNAL-LANCET, 84 South Tenth Street, Minneapolis, Minnesota.

The Dental Pain Mechanism

III. Clinical Considerations

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PATIENTS WHO EXPERIENCE PAIN about the face or head, and sometimes elsewhere, frequently consult their dentist first for diagnosis and treatment. Likewise, it is not unusual that, despite the patient's complete certainty that "an infected tooth is responsible for my pain," he sometimes must be told that his pain is not one of dental origin.

The first two parts of this series of papers dealt with some of the basic anatomy and physiology associated with the so-called dental pain mechanism. Considerably more detailed data could have been described concerning not only the pain mechanism but the other modalities as well. Dental pain has been the subject of an increased amount of research and study. A number of major seminar programs at dental and medical meetings have dedicated their entire time to papers on this theme. Usually an anatomist, physiologist, dentist, neurologist, and psychiatrist participate in these symposia. The medical-dental center at the University of California School of Dentistry now has a *team* of specialists who work as a unit and review obscure problems of head and face pain. No doubt the intensive study of such cases will lead in time to improved understanding and treatment. All this emphasis on team cooperation serves to define for each specialty its individual responsibility and to coordinate the plan of treatment. The dentist contributes to the diagnosis and works to prevent unnecessary loss of one or, occasionally, all of the teeth. The physician learns to ask the judgment of a dental colleague, and the den-

tist seeks aid from the physician. It is gratifying to note the change from the attitude that teeth are expendable and might as well be eliminated as part of a differential diagnosis. On occasion, too, the diagnosis of a neurologic entity has been changed after thorough x-ray and clinical dental evaluation.

While some of the facets of the pain mechanism have been examined in this series of papers, no mention has been made as yet of the psychologic components. The dentist is most reluctant to label a complaint as functional or psychogenic. This he leaves to others; however, several aspects of the problem may be of interest. Fear of the dentist is a process with which we are all familiar. Mother's threat to punish her child by taking him to the dentist is being minimized by mother's new discovery that modern dental treatment is not the torture she recalls from her own childhood. Every dental practitioner must face and carefully manage many fearful and anxious patients each day of his practice. Much dental progress has been introduced essentially to reduce the patient's anxiety and minimize the mental trauma formerly accumulated by a dental appointment.

DENTAL METHODS WHICH HELP MINIMIZE APPREHENSION

While the psychologic integrants of pain are better understood by those trained in psychiatry, the dentist has recently adopted other means of reducing many of the patient's apprehensions. Some of these entail practical application of the

basic anatomy and physiology of the neuromuscular system, and some involve application of biochemical and biophysical research.

Fluoridation to prevent dental caries. The use of sodium fluoride is perhaps the most notable example of the application of chemical findings. It is a good illustration of the present philosophy of preventive dentistry. While some opponents to this measure still are heard, their objections are becoming less influential. A number of communities now have completed their tenth year of fluoridation, and the statistics indicate a reduction of nearly 60 per cent in caries. More than 26,000,000 Americans are now drinking fluoridated water. In addition, 3,000,000 more individuals are drinking a water supply which naturally contains 1.0 part per 1,000,000 or more of fluoride. Some cities in Brazil, Canada, Chile, Colombia, Germany, Holland, Japan, and Sweden are also fluoridating their drinking water.¹⁻³ Fluoridation of the domestic water supply is by far the most satisfactory method of providing optimum reduction of caries. A series of topical applications of sodium fluoride also has proved beneficial. The incidence of dental caries in children has been reduced as much as 40 per cent by this method. In areas where a communal water supply is not available, sodium fluoride tablets may be prescribed. The results of this method have not been evaluated thoroughly, but clinical observations have shown it to be effective.

Anesthesia for dental procedures. The general practitioner of dentistry spends most of his working time removing caries and preparing the individual tooth with a proper cavity for retaining a restoration. Many dentists routinely inject a local anesthetic prior to cutting the tooth, which reduces much of the pain associated with the drilling. Even the brief discomfort of the needle puncture has been minimized by the prior topical application of an anesthetic.

The oral surgeon is well trained in the principles of general anesthesia, and his increased use of thiopental sodium (Pentothal), plus other general anesthetic agents, has enabled him to perform more operations with a greater degree of patient comfort than at any previous time.

Advances in technics and procedures. The major advances in the operative field, however, have consisted of the innovation of the dental burs. The new types are designed to cut more effectively. Rotating cutting instruments raise the temperature and produce vibration which, in turn, increases pain and may initiate changes

in the pulp. To counteract this possibility, continuous water sprays are now used, which aid in keeping the tooth cool and free of debris. Vibration characteristics have been improved, not only by better bur design but also by improved handpieces. A few years ago, the maximum capability of the dental engine and handpiece resulted in a bur revolving at approximately 4,000 revolutions per minute. Most restorative dentists now operate units capable of 10,000, 12,000, or 18,000 revolutions per minute, but many of the units now in use are capable of speeds much beyond this. Patients report less pain when teeth are cut with instruments that are rotating at these high speeds and when the teeth are being cooled with water. Not only are these newly designed burs and high-speed handpieces responsible for more comfort to the patient, but they lessen operating strain and fatigue of the dentist. Beebe⁴ estimated that the individual dentist can gain the equivalent of an additional two weeks' operating time each year by changing from the standard to the higher speed instrument.

Better technics in crown and bridge dentistry now enable the dentist to reduce the time his patient is in the chair to less than half that formerly required to complete and seat a finished bridge assembly.

In all of the dental specialties, vast diagnostic and technical advancements now benefit the dental patient. These few examples have been selected only to show the profession's effort to minimize many otherwise prolonged and painful dental experiences.

DENTAL PAIN AS A MANIFESTATION OF NEUROLOGIC DISTURBANCE

Cases in which a neurologic disturbance has a dental manifestation are numerous. Perhaps the largest group of such disturbances is that classified by many neurologists as atypical facial pain. These patients occasionally appear in the dentist's office with vague descriptions of a steady, dull ache that may be felt in one or more teeth, on the gingiva, and frequently in the region of the temporomandibular joint. Usually, the referral of the pain fails to follow the nervous pathway and, in many cases, involves areas outside the anatomic range of the fifth cranial nerve. Patients often suspect a tooth is the cause of their discomfort and, therefore, consult the dentist. One dental practitioner may not find the source a dental one, and the patient often drifts from one dental office to another. Some histories indicate that certain teeth were finally removed,

with the pain returning after a brief respite. The dentist sees many edentulous quadrants of the jaw in these patients. Although this happens less frequently than in cases of major trigeminal neuralgia, unfortunately it does occur. A local anesthetic diagnostic block often helps verify the suspected psychogenic features of these pain problems. My colleagues and I carry out a complete dental examination and, if satisfied that there is no evidence of dental disease, the patient is referred to the neurologist. Occasionally, a patient who is referred to the dentist with the physician's reserved opinion of atypical facial pain does show existing dental pathology. Thus, patients with atypical facial pain show considerable variation. Often a psychiatric consultation is eventually required, and treatment is instituted at that level. It must be stressed that a number of patients who complain of facial pain may have demonstrable disease in the field of the gasserian ganglion.

Disturbances of temporomandibular joint. Disturbances of the temporomandibular joint constitute another large group of pain problems shared by medicine and dentistry. These complaints usually consist of pain in the preauricular region. It is often described as of moderate intensity, which is referred from the joint itself to the ear, the parietal, frontal, and occipital regions. Patients often complain that the pain is aggravated by mastication, prolonged talking, opening the mouth wide, and sometimes on lateral or protrusive movements of the jaw. Palpating the joint elicits pain.⁵

There is considerable uncertainty about this painful entity. Many exceptional experimental and clinical studies of this problem are now in progress. These eventually may supply the data from which better treatment will evolve. One promising technic of study is the electromyographic analysis of the muscles associated with the temporomandibular joint. The usefulness of this method is limited to some extent because many of the muscles involved are not readily accessible. Another development is cinefluoroscopy. The principle of this procedure is to amplify an image of the joint movement and to record it permanently on motion picture film. Such motion pictures show for the first time the complete movements in the action of the human temporomandibular joint.⁶

Few dentists are convinced that all disturbances of this joint result from dental malocclusion and that correcting this discrepancy will result in a permanent cure. The greater majority,

recognizing that only a limited number of such joint problems are dental in origin, wisely ask the ear, nose, and throat specialist, the rheumatologist, and the neurologist to assist in diagnosis.

If it is established that the pain is a result of dental malocclusion, a number of corrective measures can be considered. One or more procedures may be required. The objective of each is to return the mandible to its correct position. These methods are as follows:

1. Occlusal equilibration is established by removal of enamel from teeth that are obstructing smooth articulation.

2. A temporary splint, modified to create a correct occlusal relationship, is inserted. This is an intra-oral device, usually made of plastic or metal, positioned over the existing occlusion long enough to confirm the exact amount of permanent rehabilitation required. Sometimes these splints are modified and function as permanent appliances.

3. The occlusal relationship is reconstructed by means of restorations of accurately fitting crowns and bridges.

Diathermy, injections of local anesthetic solutions into the muscular trigger zones associated with myositis, injections of hydrocortisone into the joint, wiring the teeth for assured rest, and several other measures are successful if utilized when indicated.

Other disturbances. Since disturbances of the temporomandibular joint and atypical facial pain are encountered rather frequently, the problems involved have been described in some detail. Many other neurologic problems are first seen by the dentist, including trigeminal neuralgia, glossopharyngeal neuralgia, paresthesia of the lips and tongue, burning sensations of oral structures, hysteria resulting in some oral manifestations, postoperative neuritis of a branch of the trigeminal nerve, causalgia, and even symptoms of centrally located tumors.

When a questionable neurologic entity has a superimposed dental pathologic problem or is in reality a problem of dental pain with other manifestations, it is most gratifying to the patient, physician, and dentist when correction of these dental pathologic manifestations relieves the pain.

COMMENT

This series of papers was prepared for presentation in this medical journal as a review of what has been termed the "dental pain mechanism." The intention has been to acquaint the physician

with the dentist's relationship to medicine in matters dealing with pain of the head and face. It was not suggested that dentists should treat conditions other than those which are confirmed to be of dental origin. Rather, it was stressed that the dentist is able to assist his medical colleague. Relying on increased data from basic research, the dentist works to increase his ability to understand and manage the many dental

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pain problems. This is being accomplished by (1) increased preventive measures to reduce dental caries, thereby eliminating much discomfort; (2) improved methods designed to increase the permanency of restorative dentistry, and similarly to reduce the patient's number of dental visits; (3) attempts to eliminate the patient's apprehension and dread of going to the dentist; and (4) continued study of this specialty.

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Book Reviews on Pain

CLINICAL APPLICATIONS OF SUGGESTION AND HYPNOSIS, by WILLIAM T. HERON, M.A., Ph.D., professor of psychology, University of Minnesota, 1957. Springfield, Illinois: Charles C Thomas, ed. 3, 165 pages. \$3.75.

The current edition of this book is the third. The volume first appeared in 1950. The author writes: "This monograph is not intended to be a compendium of knowledge about hypnosis and suggestion. There are several good books of that kind and it is assumed that those who use this monograph will have already obtained a background of this knowledge. The intention of the present work is to be as practical as possible without becoming simply a how-to-do-it book. I have endeavored to state the principles which have practical application in the clinical situation. The specific application of these principles must largely be left to the ingenuity and intelligence of the clinician.

"This monograph is written solely for professional use. It is to be hoped that those who use it will not allow it to have general circulation. Several reasons for this restriction will become obvious as one progresses through the book, but the primary reason is that we must eliminate hypnosis as a form of entertainment as rapidly as possible. An intelligent layman may apply the principles stated in the monograph as well as the professional man, but the layman does not have the background of other knowledge which will permit him to make the applications for the benefit of persons on whom he is working.

"This monograph then is dedicated to the physician, dentist, and psychologist. They, above all other men, are in the position to do the most harm to their fellow men by an unfortunate suggestion inadvertently given. By the same token they can use this device to bring the greatest benefits."

The author discusses the background of hypnosis and the ease with which it can be carried out. He explains the terms "suggestion" and "suggestibility." There is a chapter on the professional use of hypnosis, another on how to approach the patient, and a chapter on degrees of the hypnotic state. Methods of induction, posthypnotic

suggestions, and precautions in the use of hypnosis and group hypnosis are presented. One chapter is devoted to case histories, another deals with the routine for the production of clinical hypnosis, and still another discusses the use of the tape recorder in conditioning the patient. The author includes a bibliography, which is, of course, important to a work of this nature.

The book is indexed and should be a useful adjunct to the material available on the subject of hypnosis.

JOHN S. LUNDY, M.D.

SPINAL CORD COMPRESSION: MECHANISM OF PARALYSIS AND TREATMENT, by I. M. TARLOV, M.D., Professor of neurology and neurosurgery, New York Medical College, New York City, 1957. Springfield, Illinois: Charles C Thomas, 147 pages. \$7.50.

The author and his associates in the Laboratory of Neurophysiology of the New York Medical College used dogs to investigate the problem of compression of the spinal cord. This book describes their experiments and results. Illustrations and tables are employed to present the valuable data collected in the course of the study, and reproductions of histologic sections show the lesions that were produced under various circumstances.

The book contains a review of the literature and includes 57 references. The authors explain their objectives thus: "To achieve the purposes of the investigation it was necessary to find answers to 5 critical questions: (1) How long can the spinal cord be acutely compressed before functional recovery becomes impossible? (2) What are the chances of recovery of spinal cord function in cases of paralysis, complete for any given time and caused by gradual compression occurring over any given time? (3) What is the sequence of loss of function with spinal cord compression and what is its clinical significance? (4) What is the cause of the paralysis? Is it mechanical deformation of cord tissue or is it anoxia? (5) In what circumstances should laminectomy be done?"

The book is printed on good paper, is easily read, and contains a subject index. Most physicians will want to read this book.

JOHN S. LUNDY, M.D.

Analgesia and the Pharmacology of Pain

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PAIN IS A CONDITION well recognized in all higher forms of life. The symptomatic treatment of pain constitutes a major function of therapeutics. A clinician may attach considerable diagnostic value to the nature and quantity of analgesic drugs required to relieve pain. Perhaps we can describe human pain with greatest objectivity in terms of the actions of chemical substances which selectively depress pain centers.

Physiology of pain. Two neurophysiologic phenomena are usually described as constituting the sequence of pain perception. The first is "the original sensation of pain," classically depicted as an afferent impulse carried from the injured site to the cord and thence via the spinothalamic and corticthalamic tracts to the cerebral cortex. The thalamic relay is characteristic. Experimental evidence has established the fundamental importance of the diencephalic centers in pain perception. The second phenomenon is often referred to as "awareness of pain" and is considerably more difficult to define concretely. A residuum of neuronal excitation follows the original afferent volley, which reverberates through certain transactional components of the nervous system, notably the reticular formation and the internuncial neurons of the cord. The transmission of this latter component is multisynaptic, in contradistinction to the paucisynaptic course of the primary afferent impulse. By means of these multisynaptic connections with the thalamus and hypothalamus, painful sensations are modified and their conscious interpretations are determined.¹⁻³

Analgesia. The pharmacology of pain is the study of drug-induced analgesia. This may be accomplished through two principal approaches—peripheral and central. Peripherally, pain impulses may be interrupted by blocking neuronal transmission at some point along the afferent

pathway with local anesthetic agents. Centrally, the painful stimulus can be obtunded or modified by the action of depressant drugs. The present discussion is concerned with centrally acting analgesic compounds.

The term analgesia implies not only the relief of pain but the retention of consciousness. Herein lies the great difficulty in pain control, that is, to reduce pain with sufficient selectivity to avoid prolonged amnesia or somnolence. If the analgesic requirement is moderate, the patient must usually remain ambulant. However, even when general anesthesia is to be employed, immediate postoperative awakening is highly desirable. The primary therapeutic aim is to obtund pain to the maximum degree consistent with the conscious state.

Hypnotics. Almost all cortical depressants provide some analgesia. Alcohols, chloral hydrate, paraldehyde, and barbiturates can be useful if properly employed, but effective analgesia is usually accompanied by sensorial impairment. Ambulation and mental efficiency cannot be retained if full therapeutic doses of these agents are administered. In addition, the release of cortical inhibition may result in the appearance of delirium in response to pain. Greater specificity for subcortical, thalamic, and hypothalamic centers is required.

Antipyretic analgesics. Salicylates, acetanilid derivatives (Tylenol, acetophenetidin), and pyrazolones (aminopyrine, phenylbutazone) are agents of limited value for control of pain. They are particularly effective for relief of diffuse, aching pain emanating from muscles, tendons, joints, and fascia. Sensorial depression is minimal. The mechanism of action of these drugs is poorly understood. It is interesting to note the parallelism between their analgesic and antipyretic effects. Originally, they were used as febrifuges; their analgesic potency was recognized secondarily. Both pain and temperature senses travel over the spinothalamic tracts, and the hypothalamus is concerned with both temperature regulation and awareness of pain. Beyond these fragmentary correlations, little is known. As a class, their action is rather feeble.

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The analgetic effect of salicylates is somewhat increased by subhypnotic doses of barbiturates. The pyrazolones depress leukopoiesis in a small but definite number of cases. Since none of these agents can be given parenterally, their usefulness is limited. However, their relative safety within the therapeutic range guarantees their continued popularity.

Narcotics. The opium alkaloids and their synthetic congeners comprise the principal pharmacologic class of parenteral analgesics. The universality of morphine is gradually diminishing, but the narcotic problem is still very much with us. The evils of these drugs are too well known to require extensive recapitulation. The analgesia produced by morphine and related substances is regularly accompanied by certain specific side effects, including respiratory depression, smooth muscle spasm, and the development of physical dependence. Nevertheless, narcotics provide effective analgesia in much smaller dosage than other drugs, and no nonaddicting substitutes are nearly so potent. The sensorium remains relatively clear in the presence of full therapeutic doses. However, states of euphoria and dysphoria often occur. All types of pain are amenable to narcotics, although spasmogenic pain of smooth muscle origin may occasionally be exacerbated.

The intermediary effects of morphine on the brain and cord have been exhaustively studied. Wikler⁴ observed that selective depression, with consequent release phenomena, occurred at each level of integration. The thalamus is selectively depressed, and reverberation in the internuncial chains between the frontal lobes and diencephalon is diminished. Primary excitatory effects may occur. Large doses of morphine and other narcotics produce seizure patterns in the electroencephalogram in dogs. Significantly, morphine and its congeners do not depress the reticular activating system or spinal internuncial pool. This accounts for the comparative lack of effect on wakefulness and the absence of skeletal muscle paralysis.

Potentialization of narcotics. The analgesic effects of the drugs described thus far are directed primarily at "the original sensation of pain," corresponding to paucisynaptic transmission through the thalamus to the cortex. At present, the narcotics are the most efficacious agents, while preserving sensorial function. It has as yet been impossible to divorce the narcotic type of analgesia from respiratory depression and physical dependence. An alternative plan is to employ

minimal doses of morphine analogues with other subcortical depressants, which interfere with transmission through multisynaptic pathways, indicating the secondary "awareness of pain."

Narcotic reinforcement was first developed by the concomitant use of scopolamine in "twilight sleep" for obstetric delivery. Scopolamine is an amnestic and psychomotor (striatal) depressant but contributes relatively little to the summative analgetic effect. Pain characteristically evokes delirium unless a considerable amount of narcotic is added. Barbiturates, chloral hydrate, and paraldehyde are definitely potentiating to opiate analgesia but at the price of considerable sensorial impairment. The cerebral cortex and reticular activating system are extremely sensitive to barbiturates, with the result that somnolence usually precedes even moderate analgesia.

Tranquilizers. Two classes of subcortical depressants show promise as narcotic potentiators—the phenothiazines and the mephenesin-like tranquilizers. The phenothiazines are now represented by 6 drugs: chlorpromazine (Thorazine), promazine (Sparine), mepazine (Pacatal), promethazine (Phenergan), prochlorperazine (Compazine), and perphenazine (Trilafon). They exert a specific depressant effect on the thalamus, in addition to a moderate reduction of reticular activity. They synergize strongly with narcotics, reducing dosage requirements of the latter to half or less. Phenothiazines are markedly soporific and may produce a Parkinson-like immobility in large doses. In small amounts, however, they exert an appreciable narcotic potentiation with only mild sensorial impairment.⁵

The mephenesin-like tranquilizers in current use are meprobamate (Equanil, Miltown) and phenaglycodol (Ultran). Their subcortical effects are enhanced by central synaptic muscle relaxation through depression of the internuncial pool. Meprobamate has been successfully employed as a narcotic potentiator.

Narcotic antagonists. Respiratory depression incident to narcotic effect can be easily controlled by the simultaneous administration of competitive inhibitors, such as nalorphine and levallorphan. These morphine-like substances release the medulla from narcotic-induced depression but interfere only slightly with corticothalamic effects. Analgesia is preserved, with adequate maintenance of respiratory volume. The effects of certain antidepressant thiazoles, such as amiphenazole (Daptazole), may hold promise of future advantages in analgetic management.

Inhalation agents. Brief mention should be made of inhalation analgesia. Nitrous oxide, divinyl ether, diethyl ether, and trichloroethylene may be employed to produce a rapid but temporary analgesic state. This may be desirable in some situations, such as removal of dressings or surgical drains, in which painful stimuli are transitory. Although consciousness is retained, sensorial loss is considerable. However, withdrawal of the inhalation agent results in rapid return to complete wakefulness.

SUMMARY

1. Two principal neurophysiologic mechanisms are concerned with pain perception. Paucisynaptic transmission from the injury site to the thalamus and cortex corresponds to the "original sensation of pain." Multisynaptic reverberation of transactional components of the nervous system results in the continued "awareness of pain."

2. Analgesia implies not only the relief of pain but the retention of consciousness.

3. Hypnotics produce moderate analgesia, with considerable sensorial loss.

4. Antipyretic analgesics possess limited ca-

pacity for pain control, particularly diffuse, aching pain.

5. Narcotics remain our most effective analgesic drugs. Their use is regularly accompanied by the simultaneous appearance of respiratory depression, smooth muscle spasm, and the development of physical dependence.

6. Scopolamine, barbiturates, and other central depressants decrease dosage requirement of narcotics but with pronounced sensorial impairment.

7. Phenothiazines synergize strongly with narcotics, reducing the effective dosage of the latter to half. Potentative doses of phenothiazines must be small if full consciousness is to be retained.

8. Meprobamate contributes a central synaptic relaxant effect in addition to narcotic potentiation.

9. Narcotic respiratory depression can be mitigated by nalorphine or levallorphan.

10. Brief analgesia can be obtained with some inhalation agents, such as nitrous oxide, the ethers, and trichloroethylene.

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Current Literature on Pain

EVALUATION OF ANALGESIC DRUGS WITH SPECIAL REFERENCE TO SUBJECTIVE RESPONSES, by E. E. DANIEL. *Canad. Anaesth. Soc. J.* 3:198-207, 1956.

"When one comes to analyze the action of drugs which modify the pain experience, it is necessary to consider possible effects on many sites: on the pain receptors, on the transmission paths, on the integration of pain with impulses set up by other stimuli at various levels of the central nervous system, on the process of stimulation of other impulses by agents in the internal or external environment, on the past training of the organism in integrating such sensations Some of our cherished concepts may be modified as our understanding of the mechanisms whereby drugs alter subjective phenomena grows. However, cherished concepts are less valuable than the knowledge which permits maximum use of all possible therapeutic tools. We seem to be approaching a day when the study of some drug responses in patients, though difficult, will be widely recognized as necessary, wherever it is possible, because such study provides information which cannot be obtained in any other way. Significantly, it is an anaesthetist who is showing that studies in human patients do yield reliable and new

information. Furthermore, if this field is like others, re-examination of concepts because of their inadequacy in practice will have value beyond the immediate range of the practical problems which initiated the reappraisal."

From LUNDY, J. S., and MCQUILLEN, FLORENCE A.: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1956, Vol. 44. Copyright by J. S. LUNDY.

MORPHINE AND N-ALLYLNORMORPHINE: EFFECTS ON BRAIN C-14 LEVELS FOLLOWING TRACER DOSES OF GLUCOSE-C-14, by L. B. ACHOR and E. M. K. GEILING: *Arch. internat. pharmacodyn.* 105:313-316, 1956.

"Countless investigations have been directed towards elucidation of the mechanism of action of morphine, but as yet a well-defined concept of the effect of this drug on 'target' organs is not apparent. Since part of morphine's actions are referable to depression of the central nervous system, efforts to delineate the nature of possible biochemical changes occurring in the brain of the morphinized animal are pertinent Administration of morphine to rats with a tracer dose of glucose-C¹⁴ produces marked decrease in brain C¹⁴ after ten minutes.

(Continued on page 390)

Editorial

ANALGESIA

PRESENTED IN THIS SECTION ON PAIN is the third and final portion of Dr. J. A. Gibilisco's article, "The Dental Pain Mechanism: Clinical Considerations," and in this issue also is an article by Dr. Hugh S. Mathewson entitled, "Analgesia and the Pharmacology of Pain." Both of these articles are timely as pain is a constant problem, and the pharmacology of pain is a subject which currently is much alive. It is extremely useful to be able to predict the effects of various drugs or combinations of drugs on various patients as is now possible.

I have been uncommonly pleased with an analgesic procedure which I first used on June 18, 1957, to facilitate the cardiac catheterization of children who are too young to cooperate. To date, August 28, 1957, it has been used in 18 such cases with excellent results. It consists, first, of the administration of thiopental (Pentothal) sodium by rectum. This usually puts the child to sleep in ten minutes. Administration of thiopental is followed by the intramuscular injection of levorphanol tartrate (Levo-Dromoran), levallorphan tartrate (Lorfan), prometha-

zine hydrochloride (Phenergan), and either proheptazine (WY-757) or alphaprodine hydrochloride (Nisentil), all in one syringe. The dose of WY-757 or of Nisentil is repeated twenty minutes later and may be repeated two or three times after that. When the catheterization is long, the dose of thiopental may be repeated. At the termination of the procedure, the patients are given β -methyl- β -ethylglutarimide (Megimide) and 2,4-diamino-5-phenylthiazole (Daptazole) and awake promptly, although they may then sleep lightly for one or two hours after the procedure.

This technic utilizes analgesia and amnesia and avoids anesthesia for cardiac catheterization of young children. Thus, the whole problem is simplified immeasurably, since the patient breathes either oxygen or air, and the data obtained on catheterization can be interpreted readily. The procedure, therefore, contributes toward making a correct diagnosis, which lays a firm foundation for decisions concerning whether or not treatment can be carried out. This management is so new that as yet I have not reported it in any detail. Thus far it indicates to me how well many problems will be dealt with in the future by use of pharmaceuticals.

JOHN S. LUNDY, M.D.

CURRENT LITERATURE ON PAIN

(Continued from page 389)

In the presence of N-allylnormorphine, a significant reversal occurs, the mean $\bar{C}^{14}$ per gram of brain approaching the control level. Such findings indicate the possibility of morphine's interference with the uptake of glucose or derivatives thereof by the central nervous system. The existence of a permeability factor favorably influenced by NANM is postulated."

From LUNDY, J. S., and McQUILLEN, FLORENCE A.: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1956, Vol. 44. Copyright by J. S. LUNDY.

PROBLEMS OF ANESTHESIA FOR THE OUTPATIENT, by J. P. GRAF: *Anesth. & Analg.* 35:653-656, 1956.

"A large percentage of outpatients need some form of anesthesia for emergency surgical procedures, and most of these surgical emergencies are for the correction of lesions resulting from trauma. The following are the minimal preanesthetic requirements for either emergency or regularly scheduled anesthetic procedures for outpatients.

"1. The last time food or liquid was taken must be determined and the relationship of that time to the time of injury should be known if possible . . . 2. A good general physical examination is very necessary and advisable . . . 3. A concise history of previous or asso-

ciated illnesses or injuries should be obtained if possible . . . 4. . . . At least a determination of the level of the hemoglobin and a urinalysis should be made available. Additional laboratory or x-ray information should be obtained as indicated. Only after a correlation and study of the above information should the anesthetic agents and techniques be considered . . . Premedication intravenously administered is best for the non-scheduled outpatient . . .

"The problems associated with anesthesia for the outpatient are not those of any new or radical principles in anesthesiology. Rather, they are the problems of the less well prepared patient who must be anesthetized in surroundings and under circumstances that are not the best. These patients require all the care that the regularly scheduled patient receives."

From LUNDY, JOHN S., and McQUILLEN, FLORENCE A.: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1957, vol. 45, page 74. Copyright by JOHN S. LUNDY.

POST-OPERATIVE OBSERVATION WARD, by CLIVE JOLLY and J. A. LEE. *Anaesthesia* 12:49-56, 1957.

"From the time of induction of anaesthesia to full recovery of consciousness, a patient is under skilled and careful observation with the exception of the immediate post-operative period . . . It is not perhaps surprising that a certain proportion of deaths associated with operation occurs in the immediate post-operative period. Obstruct-

(Continued on page 34A)



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CURRENT LITERATURE ON PAIN

(Continued from page 390)

ed airway, cardiovascular depression, inhalation of blood or vomit and inadequate respiratory exchange due to partial eurarization with the resulting hypereapnia are a few of the causes

"Much can be said about the desirability of a post-operative observation ward to cover this hiatus in the care of the patient. Recently a post-operative observation ward, was opened at the General Hospital, Southend, and this article will review the experience gained in its first year of existence and discuss the lessons learned during that time. Enlightened observation and intelligent common sense, allied with simple equipment readily available, are the fundamentals required

"Summary of advantages: (1) Centralization of all post-operative patients where they can be kept under constant observation by nearby anaesthetists and surgeons and given individual attention (2) Economy in nursing staff (3) Economy in equipment (4) Increased safety (5) Legal protection. The POW is good prophylaxis against the disease of litigation because of the increased care of the patient and by the very presence of an extra and specialized unit in the hospital. (6) Psychological. The patient coming around from his anesthetic and being treated perhaps for shock is not in the full view of other ward patients, some of whom are expecting their operation. He, in his turn, is spared the general bustle of a busy surgical ward in the hours following his operation

"With increasing experience in the working of a POW, it has been interesting to see it accepted into the life of the hospital and welcomed as a useful step forward, especially by the surgical and anaesthetic staffs. Perhaps in the future all the really acute nursing of a hospital

will be congregated in a few acute wards looked after by the cream of the nursing profession."

From LUNDY, JOHN S., and McQUELLIN, FLORENCE A: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1957, vol. 45, page 101. Copyright by JOHN S. LUNDY.

THE USE OF ELECTRICAL CURRENT AS AN ANESTHETIC AGENT, by R. C. KNUTSON, FAE Y. TICHY, and J. H. REITMAN: *Anesthesiology* 17:815-825, 1956.

"In previous experiments it was demonstrated that the successful production of electrical anesthesia, or electro-narcosis, could be accomplished by applying some of the techniques of modern anesthesiology. The complications of cyanosis, bradycardia, cardiac irregularities and severe muscular contractions, which had been encountered by earlier investigators of electronarcosis, were eliminated or modified by these techniques. For example, endotracheal intubation abolished the respiratory difficulties, atropine sulfate given before the production of electronarcosis prevented cardiac irregularities, and curare decreased muscular contractions to the extent that operations were performed upon animals narcotized only by the electrical current. Before electronarcosis could be used as an anesthetic agent in humans it was necessary that the deleterious effects of electrical currents, applied for prolonged periods, be studied in animals. After these effects were found to be minimal, the method of electronarcosis was then applied to human beings

"Twenty-five dogs were given electronarcosis for three hours with a continuous alternating current of 50 milliamperes, 700 cycles per second, 16-20 volts. Pathological studies of the brains and spinal cords revealed no evidence of neurological damage owing to the continuous

(Continued on page 36A)

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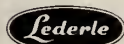
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CURRENT LITERATURE ON PAIN

(Continued from page 34A)

passage of the current. A marked hyperglycemia which tended to increase during the electronarcosis was present. The blood urea nitrogen rose significantly during the three-hour period of electronarcosis. No changes occurred in the serum calcium, sodium, chloride and potassium.

"Electrical anesthesia was administered to 5 patients by means of an alternating current of 135 milliamperes, 700 cycles per second. Marked hypertension and tachycardias developed during the passage of the current."

From LUNDY, JOHN S., and McQUILLEN, FLORENCE A: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1957, vol. 45, page 115. Copyright by JOHN S. LUNDY.

THE ROLE OF HYPNOSIS IN ANESTHESIOLOGY,

by M. J. MARMER: J.A.M.A. 162:441-443, 1956.

"Hypnosis can be a valuable addition to the armamentarium of the anesthesiologist In fact, every anesthesiologist should also be a hypnotist Hypnosis minimizes fear and apprehension and is valuable as an adjunct to the measures commonly employed in sedation before and after operation. It can be attempted when chemical anesthetics are contraindicated. Post-hypnotic suggestion has proved to be of great value in the postoperative course, namely, in reducing or eliminating nausea, vomiting, and pain. Hypnosis is a successful auxiliary measure for inducing anesthesia and can effect anesthesia alone.

"Patients vary in their susceptibility to hypnosis, and a deep hypnotic level cannot be reached in every instance. Ideally, hypnosis should be used in combination with chemical agents to achieve anesthesia. The only disadvantage to hypnosis is that its effective application

requires a considerable expenditure of time, a negative quality that is more than offset by its many advantages. Hypnoanalgesia was effectively employed during a resection of the lingula for tuberculoma of the upper lobe of the left lung in one patient."

From LUNDY, JOHN S., and McQUILLEN, FLORENCE A: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1957, vol. 45, page 129. Copyright by JOHN S. LUNDY.

CONTROL OF POSTOPERATIVE VOMITING WITH MAREZINE: A DOUBLE BLIND STUDY, by D. C. MOORE, DONALD BRIDENBAUGH, V. F. PICCIONI, P. A. ADAMS, and C. A. LINDSTROM: *Anesthesiology* 17:690-695, 1956.

"The effectiveness of parenteral injections of Marezine (cyclizine lactate) to control postoperative vomiting has been both asserted and denied. Consequently, a double blind study of Marezine seemed an acceptable method for re-evaluating the drug

"Decoding the tabulated information revealed that: (1) of the 276 patients who received the 'Marezine routine' with the solvent only, 77 vomited, or 27.9 per cent; and (2) of the 273 patients who received the 'Marezine routine' with solutions containing Marezine, only 41 vomited, or 15 per cent

"Marezine significantly reduced the incidence of postoperative vomiting during this double blind study. This would seem to substantiate previous reports which had asserted the effectiveness of Marezine but which had not employed the double blind technique of evaluating the drug."

From LUNDY, JOHN S., and McQUILLEN, FLORENCE A: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1957, vol. 45, page 134. Copyright by JOHN S. LUNDY.

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General Surgery, One Week, October 28.
Fractures & Traumatic Surgery, Two Weeks, October 21.

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General & Surgical Obstetrics, Two Weeks, November 4.

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Angiocardiographic Interpretation in Congenital Heart Disease, by HERBERT L. ABRAMS, M.D., and HENRY S. KAPLAN, M.D., 1956. Springfield, Illinois: Charles C Thomas, 233 pages. \$11.75.

In the past few years, there has been a pronounced resurgence of interest in the subject of congenital heart disease. Because of the possibility of surgical correction, practical urgency has been added to the clinical challenge of obscurity in the diagnosis of these conditions. Angiocardiography is one of the basic tools available for the precise delineation of the pathologic anatomy of the heart and great vessels. While it is as yet too early for a definitive textbook in this field, the need for a guide through the maze of angiocardiographic interpretation is great. This small volume fits that need admirably.

The photographic reproductions of the roentgenograms are almost invariably clear. In addition, excellent diagrams accompany each of the roentgenograms. These are very helpful for orientation. A brief consideration of the clinical, anatomic, and physiologic factors involved in each of the entities considered also aids in understanding the angiographic features. The discussion of

BOOK REVIEWS

the angiocardiograms themselves is clear and detailed.

No attempt is made to be encyclopedic. Some of the extremely rare anomalies are not considered.

A few objections may be raised. The advocacy of general anesthesia for this study is open to serious question. As the authors themselves point out, an additional real risk is added to the procedure by employing such agents. Most experienced workers in this field agree that the use of general anesthetics is not indicated. Two injections at one sitting in order to provide two projections, as advocated in certain cases by the authors, is unwarranted in view of the added risk and is unnecessary with the use of biplane equipment. In the absence of such equipment, it would probably be

wiser to give the second injection at a later date when needed. More minor objections might be raised to grouping together ostium secundum and ostium primum defects in the discussion of atrial septal defects and to the discussion of angiocardiography for atrioventricularis communis.

The authors have contributed an excellent primer of angiocardiography. Their book will find a useful place in the libraries of physicians interested in congenital heart disease. It is highly recommended.

RICHARD G. LESTER, M.D.

•
Obesity—Its Cause, Classification and Care, by E. PHILIP GELVIN, M.D., and THOMAS H. MCGAVACK, M.D., 1957. New York: Paul B. Hoeber, Inc. \$3.50.

This reviewer enjoyed studying this volume. The authors covered many fields, among which were metabolism, etiology, general management, and the use of drugs. However, much of the value of this book lies in the opinions of the authors and their various hints as to management gained from their personal experience primarily at the Obesity Clinic of the Metropolitan Hospital in New York City.

(Continued on page 40A)

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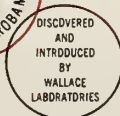
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BOOK REVIEWS

(Continued from page 38A)

The bibliography lists 131 titles. I would summarize this review by saying that the book is a worthwhile addition to the doctor's office and should be of assistance in the management of cases of obesity and especially those which one may call "difficult cases to handle."

ROBERT B. RADL, M.D.

Your Child and Mine, by O. E. HOOD, with introduction by TRACY J. PUTNAM, M.D., 1957. New York City: Harper & Brothers, 72 pages. \$3.00.

Recently, quite a few physicians and electroencephalographers have begun to realize that many mentally handicapped, difficult, and delinquent children are victims of a demonstrable injury to part of the brain. Some were injured at birth, perhaps during a hard labor, while others may have been injured by an attack of encephalitis, associated with one of the exanthemata. As Dr. Putnam says, "It is unfortunate that so often we doctors don't realize that the child has a crippled brain." Dr. Putnam is happy over what Mr.

Hood, an able teacher, is doing in the boarding school he is running for mentally disabled children. It is called "The Institute for Child Study." With Mr. Hood's dogged determination, patience, and skill, he has been able to return to their homes "a surprising number of children considered hopeless by all physicians who had examined them."

It's a comfort to find an expert like Mr. Hood saying that "there's no crime so heinous as that of building needless hope in the hearts of families, causing them to make treks to far-off places and spend all their savings for a 'cure,' which is shown by prior history and medical records not to be possible." Too often a physician with mistaken kindness tells the mother to continue to hope, which means that she goes on wasting hundreds or thousands of dollars on examinations of a child who is obviously past help.

Many of the handicapped children treated by Hood have convulsive seizures. Many are so mentally retarded that it's hard to teach them anything. But, as Mr. Hood says wisely, "intelligence alone is not always the most important thing

in judging of what these children may be able to do. Some have other faculties which, if built up, can enable the child to be of some use in the world."

As Mr. Hood says, in many homes the defective child takes so much of his mother's time that he "begins to act as acid on her nerves, slowly eating away the nervous tolerance that is the basis for mother love and affection." Often, also, the mother's concentration on the problems of the child cause her to neglect her husband and to alienate him from her.

Mr. Hood says many epileptic children must be made to see that their seizures are not a punishment for some real or imagined transgression. Some are in great need of reassurance on this point. Mr. Hood, who had a defective child himself, knows how difficult it is for many parents to face the fact that their child is hopelessly deficient. He says that this problem of helping mentally defective children is so surcharged with painful emotion that, even when an expert in this field tries to help the parents, they are likely to turn on him in wrath.

WALTER C. ALVAREZ, M.D.

News Briefs . . .

North Dakota

A NEW PARTNERSHIP has been formed to operate the Medical Arts Clinic under construction at Minot. Formation of the partnership involved dissolution of another, which included Dr. A. R. Sorenson, Dr. V. J. Fischer, and Dr. Roger Sorenson. The new partnership is comprised of the same 3 physicians and Dr. W. C. Hurley. Dr. Lloyd A. Giltner is also associated with the firm.

• • • •

DR. AUGUST C. ORR, well-known Bismarck physician, was the recent guest of honor at a surprise birthday party given for him at the Capital City Clinic. It is the custom to honor the clinic physicians on their birthdays at small, impromptu gatherings. However, Dr. Orr's party was a celebration which included approximately 65 friends, patients, and former employees. Purpose of the affair was to pay tribute to the man who has continued to practice medicine in spite of the fact his eyesight has been failing for about a year. With the assistance of associates and nurses, Dr. Orr has maintained his practice on a full-time basis. Among the gifts received were a tape recorder, luggage, and a transistor radio.

• • • •

DR. RICHARD H. LEIGH has been named Grand Forks County coroner to succeed Dr. T. Q. Benson. Dr. Leigh, who is in practice in Grand Forks with his father, Dr. Ralph Leigh, studied medicine at the University of North Dakota and completed his studies at the University of

(Continued on page 42A)



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Then and Now— The Surgical Arena Three Decades Ago

OWEN H. WANGENSTEEN, M.D.

Minneapolis, Minnesota

THE CHANGING SURGICAL ARENA

THE DISCOVERY OF ANESTHESIA and the beginnings of antiseptic and aseptic surgery may seem a long way off to the modern medical student. A succession of four generations of practicing physicians takes us back to the pre-anesthetic days, when there was no elective surgery and all operations concerned matters of the greatest urgency and were carried out in haste. Three generations trace back to Lister's discovery, not so quickly absorbed into practice as anesthesia, but its ultimate adoption made surgery a far more acceptable recommendation to the patient.

The surgeon who stood on the brink of his career at the turn of the century and looked back on the trying days of his surgical forebears must have offered up many a prayer of gratitude that during his professional life anesthesia and asepsis would be accessible to him. Just so today, the young surgeon surveying the wide field of surgery, as well as its increasing list of accomplishments, must experience abiding satisfaction over the promising prospects before him. He knows too that in the resolution of his difficult tasks he will have many competent colleagues in varied areas of medical interest available in hospitals everywhere to help him, even though they may cut in on his range of activities somewhat.

OWEN H. WANGENSTEEN is professor and chief of the Department of Surgery at the University of Minnesota.

The general surgeon of my early days was schooled to believe that he could learn to do most operations well. Today, a more disciplined surgeon knows that, with experience, he probably can come to perform operations in one of surgery's sectors of endeavor and carry the related responsibilities on a level of competence at or even better than par; that, if he wanders over the entire broad territory of general surgery, he may do a large number of operations in many fields in a reasonably standard manner; yet, compared with the performance of an expert in a particular field, his performance will be substandard in some if not many respects.

In the surgical arena today, there is no longer a single surgical team which takes on all comers and performs all operations, but a group of surgical teams with special interests. Not only are certain areas sharply demarcated for the avowed specialist, such as the neurosurgeon, orthopedist, or urologist, but in the province of general surgery itself, there is far more specialization than there was thirty-five years ago when I began my surgical residency training. A few surgeons elect segments of the alimentary tract as their special field of activity; others choose areas in the thorax, the peripheral blood vessels, or the heart itself. Young surgeons on the make often work successively in a number of these areas to obtain exposure to a broad background of experience, so necessary for mature development, no matter in what surgical interest they come to spend the greater portion of their professional life.

During my study trip abroad in 1927-1928, I spent two months in the British Isles, largely in the hospitals of London. One day at St. Thomas' Hospital I had the good fortune of observing Sir Percy Sargent perform hypophysectomy through a frontal approach for the relief of acromegaly. A coronal skin incision was made; the bone was sawed with a small saw, such as one might find in a carpenter's tool kit; the dura was incised; the right frontal lobe of the brain was elevated gently; the sella turcica was incised and, employing suction, Sir Percy sucked out the contents of the fossa. The temporofrontal bone flap was sutured back, and the operation was completed in the space of twenty-eight minutes.

A few days later, I had the privilege of making ward rounds with Sir Percy and his house staff. When he stopped at the bedside of the patient with acromegaly, he turned to ask if I had seen Harvey Cushing at work in his clinic. In reply, I stated that I carried a letter of introduction to Dr. Cushing and hoped to be able to see him on my return. When I remarked that I was astounded that Sir Percy could do this difficult operation so quickly, he said that time was of the essence in operations like this, and ventured to suggest that Harvey Cushing's meticulous methods of operating on brain tumors were often tedious and prolonged. Sir Percy doubted such procedures would get on with neurosurgeons in England. I countered by saying that Halsted, who had been Cushing's teacher at Johns Hopkins, had given impetus to the observance of great care in operations, taking time to do them well; that this influence had not yet spread broadly in America, but that I thought it was gaining. As an afterthought, I added that Sir Percy might be pleased to know that one operation which Halsted thought should be done with great expedition was a thyroid lobectomy for severe exophthalmic goiter; that Halsted had stated that anyone who could not do a lobectomy within ten minutes should not try it. Sir Percy was not as incredulous as some of Halsted's followers have been over this bit of news. (They will have no difficulty finding the statement in print, if they will take the time to peruse Halsted's writings on the surgery of goiter.) Sir Percy stated it was his firm conviction that thyroidectomy, including lobectomy, was an operation in which the surgeon should take all the time necessary to do the operation well; that even when operating for severe Graves' disease, he took more pains than usual.

This little exchange, which Sir Percy's house

staff obviously enjoyed as much as I did, served as a sort of slow catalyst to set my mind thinking about the subject of the time factor in operations. One of my teachers, the late Dr. Arthur A. Law, a very skillful surgeon, was wont to do a radical operation for cancer of the breast, and a few other operations, with an eye on the wall clock. Some of my confreres of student days who may stumble across this article will recall, I am certain, Dr. Law's obvious pleasure and the sense of drama that prevailed on such occasions. When Law was scheduled to remove a leg for diabetic gangrene, the spectators' stand in the operating room was assured of full occupancy. Brandishing an amputating knife with a long blade, Dr. Law stood poised with military bearing for the ordeal. He would say, "Are we ready?" Then, with a final glance at the clock over his half-circle glasses, he would call for time and at the same instant would plunge the long knife blade through the thigh just over the femur until it emerged on the other side. With one firm sweep, the knife blade would sever all the structures, including the skin of the anterior aspect of the thigh; the blade was then introduced similarly beneath the femur, cutting out a longer flap on the posterior aspect of the thigh. After the hasty application of a few hemostats, the saw would be grasped to sever the bone. Again, Dr. Law would call for time. I can recall on more than one occasion, he did this portion of the operation in less than thirty seconds. Had Law lived in Robert Liston's day in London, I am certain there would have been competitive timekeepers carefully observing the score and conveying the telling information back and forth between these colorful gentlemen.

In Berlin in 1928, I saw Professor Sauerbruch do an extensive thoracoplasty in the space of ten minutes; on other occasions he would take infinite pains, and considerably more time, to do a much lesser procedure, terminating the operation with a touch of finesse and finality which the hurried procedure did not have. Having been privileged to spend a year of my surgical fellowship at the Mayo Foundation (1924), where many skilled surgeons operated more rapidly than is current today, I, too, came early to believe that despatch was a significant item in operations. As the years have gone by, however, and operating room procedures have had help from many sources, most surgeons have grown to feel that the time factor per se is of little moment in most operations. The important thing is to take enough time to do the operation well.

About twenty years ago, a group of distinguished American surgeons from the mid and far

west made a brief visit to our operating rooms. A difficult gastric resection on a large patient was under way. During a trying part of the operation, which deserved my undivided attention, I asked Dr. Ralph Knight, our anesthetist, if he would comment on the anesthesia. Feeling a sense of pride over its smoothness, he said: "We have now been operating for two hours and twenty minutes." It was obvious that we had not progressed very far with the operation. As I turned to note the effect of this news upon the group, I realized that a general exodus was under way. We had no spectators, and Knight had no auditors to hear his comments on how the skillful administration of an anesthetic made it possible for the surgeon to be unhurried. Surgeons of that day had little patience with the slow operator. They knew that they could do that operation well and easily in an hour and a half. It was not uncommon, even as late as 1940, to have a patient ask in the outpatient clinic if it was true that an operation for peptic ulcer took four hours. My friends had spread the word.

DEPARTMENTALIZATION THIRTY YEARS AGO

Three decades ago, there were teaching Divisions in the Department of Surgery that did not have correlated hospital services. Orthopedists were called in to see skeletal cases; if operations were suggested and general surgeons could do them, they usually did. Yet, all the lectures in orthopedic surgery were given by orthopedists. There was no division of neurosurgery. This was to come many years later.

Urology. The only surgical specialty which had a few beds allocated to it was urology. The general surgeons did the surgery of the kidney and ureter and for neoplasms of the bladder and testis. The urologists performed the surgery of the prostate and for traumatic injuries involving the bladder and ureters.

Many of the students of my era will remember how the late Dr. Franklin R. Wright removed the prostate under HMC anesthesia (hyacin, morphine, cactine). Our instructions were to give the patient a number one HMC two hours before going to surgery and, if the patient moved when the nurse shook him one hour before his arrival was anticipated in the operating room, he was to have an additional hypodermic injection of number two HMC. Dr. Wright was a surgeon of the quick and ready variety and no slave of the trivial minutiae of operating technic. He had been trained primarily as a dermatologist, and, in his day in this area at least, the treatment of venereal disease

and especially gonorrhea and its complications fell to the urologic surgeon. Today, all this has changed, largely because of penicillin. Now, there being very few complications from gonorrhea, the urologic consultant is rarely needed in the management of Neisserian infections.

In performing prostatectomy, Dr. Wright would quickly make an extraperitoneal excision down to the bladder, talking frequently all the while of his early years in the Vienna Circle of Clinics. When the bladder was opened, he would slip his left hand, beneath the drapes and the patient's leg, into the rectum to elevate the prostate, then ask the nurse to put a tug on the glove over his right index finger, and one of the assistants would snip off the end of the glove. Dr. Wright always kept the fingernail of his right index finger a bit longer than the others so that he could readily enucleate the prostate. All this took but a few minutes. The prostatic bed was packed snugly with gauze, which was brought out through the bladder opening together with a suprapubic drainage tube. As the wound was closed, Dr. Wright almost invariably would add, "I have done more than 1,500 of these cases and I can't remember when we last lost one."

There was much talk in those days of how sudden decompression of the bladder would terminate in uremia. It was Dr. Wright's custom to insert a catheter and attach an outflow receptacle to a bedside standard to trap the urine above the level of the bed so that the bladder would empty slowly and incompletely. Pyelonephritis and ascending urinary tract infection, attending the use of inlying urethral catheters, of course, were commonplace. It remained for the present director of the Division of Urology, Dr. C. D. Creevy, to point out that sudden decompression of the bladder was not accompanied by any special side effects per se upon the urinary tract; that it was infection which was responsible for what surgeons for long years had erroneously attributed to sudden decompression.

Neurosurgery. Harvey Cushing was at the height of his activity at the Peter Bent Brigham Hospital in the mid-twenties. Trained as a general surgeon at Johns Hopkins under Halsted, he early capitulated to a suggestion from Halsted to follow neurosurgery as a career. He went to Berne, Switzerland, at the turn of the century and divided his time between Theodor Kocher's Clinic and Hugo Kronecker's Physiological Institute, where he did his classical experiments on cerebral compression. After 1904, papers on general surgery practically ceased to come from the pen of Cushing, who then delimited his professional writing exclusively to neurosurgery.

He was the first to devote all his surgical ability to the field of neurosurgery.

Victor Horsley of London, trained and skilled in neuro-anatomy, had done basic research on cerebral localization a decade before the turn of the century and devoted the major portion of his time to neurosurgery. There had been other general surgeons too: Ernst v. Bergmann and Fedor Krause of Berlin, William Macewen of Glasgow, and W. W. Keen of Philadelphia, who gave special attention to neurosurgery, and there was an occasional general surgeon like Charles Frazier of Philadelphia, especially adept in a few select neurosurgical operations.

Walter Dandy, imaginative and enterprising, came to exert great impetus in the progress of neurosurgery. However, to the pioneer work of Harvey Cushing must go the major credit for establishing neurosurgery as a specialty. Perhaps few men have influenced the development of a sector of surgery as much. It was probably Cushing's basic training in surgery and work under Kronecker, complemented by great technical skill and a keen historic and warm literary interest, which made it possible for him to wield such a significant influence on the rise of his specialty.

Today, in every department of surgery, neurosurgery rightfully has an important place. In Minnesota, it came to be a strong and sturdy surgical specialty through the impetus which Adson gave to it at the Mayo Foundation and through the contributions which Dr. W. T. Peyton, director of our Division of Neurosurgery, and his associates have lent this area of surgical interest.

Harvey Cushing's emphasis on experience. On my return to New York in September of 1928, I went to Boston to visit its wonderful hospitals before returning to my teaching duties at the University. A good portion of this time was spent at the Peter Bent Brigham Hospital. The names of Cushing, the Mayos, Halsted, and Crile had frequently been on the lips of professors of surgery in Europe and in the British Isles as I moved about there from clinic to clinic. It was, therefore, for me a special privilege to have the opportunity of finding Dr. Cushing, busily at work in his clinic, doing a brain tumor operation almost every day in the week. During my brief stay, experiments with surgical diathermy were under way, and Mr. W. T. Bovie was frequently there to note how the procedure of sparking hemostats with the diathermy current facilitated hemostasis.

It was quite obvious that Cushing was a master technician, interested in every item of the

procedure, including the arrangement of instruments and many details of operation which surgeons often deal with on a "catch as catch can" policy. Never before had I seen hemostasis carried out with such precision. School was not in session during my September visit, and there was only one other visitor during the many days I spent there. Cushing would nod, but rarely spoke to spectators even during the course of a long operation. His complete absorption in the procedure was quite obvious.

One of the things that fascinated me particularly was the seeming ease with which Dr. Cushing identified the area to be excised in infiltrative non capsulated brain tumors. Appreciating that Dr. Cushing was a direct man, replying to inquiries often with somewhat blunt answers, I had thought over a line of interrogation to pursue in trying to get some first-hand information upon the important point of determining the borders of diffuse tumors, a question puzzling to onlookers but which Cushing resolved with obvious evidences of ready orientation. So I said: "Doctor Cushing, how do you with such ease demarcate the area for excision in such an infiltrative brain tumor?" Dr. Cushing replied: "Experience." Then I said: "With no tell-tale signs in evidence on the surface, how do you orient yourself so easily in delineating the area to be excised?" Dr. Cushing replied again, "Experience." Knowing that Dr. Cushing had at one time been keenly interested in cancers of the breast, I ventured to say: "Doctor Cushing, is it a contrast in texture of the tumor as in breast cancer? A slight color difference? How do you make an almost impossible task seem so easy?" As Dr. Cushing removed his operating gown and tossed it into the hamper, he gave a final quick glance in my direction and repeated: "Experience," walking off to the dressing room, where he probably could not be alone for very long either.

Since I have gotten on in years myself, I have come to know that such a time is not particularly appropriate to protract a tired surgeon's labors. Yet, young men today too want to make the most of every opportunity. Six years went by. In September 1934, at a dinner meeting of the Wisconsin State Medical Society in Green Bay, Dr. Olin West, guest speaker, remarked that he had recently read an essay of the great neurosurgeon, Harvey Cushing, on Experience in Surgery. Failing to find any published reference to it, I wrote Dr. Cushing. He seemed to remember our informal interchange on the subject a few years before. In a very courteous and cordial letter, Dr. Cushing replied that he

had not written an essay under such a title, but added: "The subject of Experience is an item frequently on my mind; it is, however, an instruction not readily communicated to others."

Orthopedic surgery. Orthopedic surgery began to get on as a specialty in this country after World War I, as it did in Britain. Enterprising orthopedic surgeons came to have special hospitals under their direction for the care of crippled children. This movement took on in our country too and antedated the present trend, long overdue, of consolidating in the teaching hospitals of our Medical Schools the care of crippled children as well as adults under the wing of the Division of Orthopedic Surgery. The present plan of staffing Veteran's Hospitals throughout this country with the aid of Deans' Committees of University Medical Schools has proved the superiority of this mode of operation.

James E. Moore, great scholar and surgeon and teacher of surgeons of his day in this area, was for many years a strong leader in this Medical School. It was he who largely fashioned the development of our graduate scheme of medical training. Before Moore became chairman of the department, one of his early interests had been orthopedic surgery, a circumstance which may have persuaded Dr. Arthur Gillette to urge construction of the new hospital to be built for the care of crippled children at Phalen Park (1911) rather than on the campus of the Medical School. Whereas traces of fear and resentment of competition still persist in our staffs, I have the feeling that today so important a question would stand a better chance of being resolved with the long view in mind.

Wallace Cole in 1929 became the director of the Division of Orthopedic Surgery, and under his aegis the activities of the Division took on continuously wider scope and increased teaching functions. At the Mayo Clinic, orthopedic surgery began to take on the characters of a specialty under Melvin Henderson in 1914 and continues to flourish under the vigorous direction of Ralph Ghormley.

Surgical ward rounds. When on Saturday mornings in the early twenties the surgical staff gathered to make its weekly Grand Rounds, a group of stellar surgical performers were regularly on hand. It was always a lively occasion. Among others present were Dr. Arthur C. Strachauer, chairman of the department, Archibald MacLaren, Arthur Law, Harry Ritchie, James Johnson, George Dunn, Roscoe Webb, Franklin Wright, Angus Cameron, surgical residents, and the interns. As the group progressed from bed to bed, questions relating to diagnosis and ther-

apy held the center of interest and dominated the discussions. Only the internists among the clinicians of that day took a specific problem to a conference room for a more exhaustive and, occasionally, an exhausting discussion. Surgeons of that period were great individualists more likely to rest their arguments upon their own experience, or upon expressions of colleagues known to be friendly to their own attitudes, than upon objective evidence. Very rarely did experimental evidence creep into presentations. Yet, those colorful weekly sessions had important teaching value for the surgical clerk too, who was not encouraged to be present but who could tag along behind.

SURGICAL WARDS, THEN AND NOW

Thirty-five years ago, during my internship at the University Hospitals (1922), acute surgery occupied a large portion of the staff's attention. Cases of appendicitis with peritonitis, osteomyelitis, empyema, and severe hand infections were commonplace. Patients presenting one of these disorders were always available for purposes of teaching. In the fall of the year, we always saw shredded hands from corn-picker injuries. Elective surgery consisted largely of goiter, hernia, biliary tract disease, peptic ulcer, and various malignancies.

The cautery was applied to oral cancers. Operation was rare for gastric cancer. Total gastrectomy had not been performed at the University Hospital, and the abdominoperineal operation for rectal cancer was yet to come. The Block-Paul-Mikulicz exteriorization operation was performed regularly for cancer of the left colon. Cancer of the right half of the colon was excised by using a Murphy button for the anastomosis, or as a two-stage procedure using a suture anastomosis.

It is interesting to recall that among the initial group of surgeons making up the American Thoracic Association, our Department of Surgery was well represented. Drs. J. F. Corbett, A. A. Law, and William Lerche were all members. Yet, apart from operations for empyema, no formal thoracic surgery, as recognized today, was done. In the mid-twenties, Law started doing thoracoplasties at Glen Lake Sanatorium. Harrington began his important work with excision of mediastinal tumors at the Mayo Clinic in the early thirties.

Surgery has become so departmentalized that, save for the occasional consultation with urologist, neurosurgeon, and orthopedist, a young surgical house officer no longer can have frequent and direct contact with many aspects of surgery at the same time, as in earlier years. Each Divi-

sion of Surgery has its own sphere of activity. This means that all of us, of course, perform fewer operations than was customary thirty years ago. Our operating rooms are better staffed. There is a far larger number of experienced and better trained nurses. Surgeons in university clinics today have more time for research. I am not certain that the teaching interest manifested by the staff as a whole, however, is any keener now than it was then. Teaching and the care of patients were essentially the two chief occupations of a clinical department three decades ago. Today, the stature of a department depends in large measure upon the character and fate of the men trained there and upon their contributions to the patrimony of surgical knowledge. In many respects, the American university surgical clinic today has become organized along lines not unlike the European Germanic Clinic of thirty years ago.

INFECTION

Many a recent graduate of our Medical School has never seen a case of erysipelas. For the surgical house officer of the twenties, this unhappy experience was much too frequent. To see a colleague lose his life through the scratch of a rabbit or to see a teacher have his arm amputated and subsequently lose his life from a lymphangitic infection of the hand — these were post-Listerian experiences which fell to the lot of all surgeons to observe up to the sulfonamide era. Today such occurrences are unknown.

Many surgeons of World War I days became devotees of Dakin's solution and believed that it might be the Chemical Messiah, which was to lead us out of the fear and bondage of suppuration. Even the late W. W. Keen felt that Dakin's solution was the long sought agent that would overcome infections and make septic wounds clean. Great was the disappointment of surgeons to relearn again the bitter lesson that their role in combatting infection is essentially that of pus evacuator.

In the early thirties, a young girl of 19 who taught school near the Twin Cities was admitted to the wards of the University Hospital with a septic thigh injury. To increase the warmth of her country schoolroom, the young teacher had poured what she believed to be kerosene on a smouldering fire, but the can contained gasoline. One of the stove lids was blown out and impaled the young woman's thigh, inflicting a severe compound fracture of the femur. The wound was debrided immediately upon entry to the hospital, but a few days later cellulitis and a steeples fever supervened.

The young girl's father requested a consultation with a surgeon experienced in dealing with traumatic injuries. A member of our staff, who had worked extensively in combatting infections in World War I, consented to see the patient. He advised long incisions of the infected extremity. Some of us, who had more conservative attitudes toward infection, were reluctant to believe that such an incision could halt the inflammation. The consulting surgeon, therefore, kindly agreed to make the incision. A few days later, when the fever was still raging, he made a similar incision on the opposite side of the thigh and finally a third on its posterior aspect. None of these had any influence on the fever. Our consulting surgeon then suggested that amputation was the only alternative to stem the inflammatory process. The suggestion was concurred in by the staff, and preparations were made to perform a high thigh amputation. The patient sent for me, begging that we consider any alternative that might spare her extremity. As a student, I had read John Hilton's book on Rest and Pain (1862) and had a sketchy familiarity with the work of von Bergmann of Berlin in the Russo-Turkish War of the 1870's and the publications of F. S. Dennis of New York of the mid-eighties on the treatment of compound fractures with encasement in plaster casts. Since entry to the hospital, the young woman's leg had been suspended in traction on a Balkan frame, as was customary after World War I. The morning following application of a bilateral hip spica extending from the toes of both legs up to beneath both axillae, the patient was free from pain for the first time since admission. One could shake the bed without causing her distress, and within a couple of days she was afebrile. In fact, the only complication from this somewhat robust surgical therapy was herniation of the sciatic nerve through the long posterior wound, with ensuing persistent paresis of the common peroneal nerve. This eventually necessitated an arthrodesis of the ankle joint to overcome foot drop.

THE WOUND INFECTION PROBLEM TODAY

Since the coming of sulfonamides and antibiotics, death from rampant lymphangitic cellulitis has become virtually unknown. Yet, we who are surgeons know that some of the problems which challenged Lister still confront us. Control of surgical infection is still probably one of the most important problems with which surgeons have to contend today.

Lister concerned himself greatly over attempts to sterilize the atmosphere of operating rooms. As years went by, and surgeons started to wear

masks and learned to encase their hands in gloves and prepare the patient's skin effectively and to sterilize instruments and drapes, they began to believe that Lister's efforts to sterilize the air of the operating theater had been unnecessary. More recently, however, interest has been revived in this aspect of operating room problems. Obviously, it is not going to be easy to render the atmosphere of operating rooms bacteria-free. It is, however, an important component of operations which still demands solution.

Moreover, patients have their convalescence protracted and die occasionally after aggressive surgery because of smouldering infections which eventually get out of hand, digest suture lines, or disrupt blood vessels. Such occurrences suggest that delivery from the bonds of suppuration has been incomplete. If surgeons ultimately can make infection of clean wounds a matter of surgical history, a tremendous impetus will be lent to the more consistent success of formidable operations.

Yet, when postoperative infections develop today, the problem is essentially what it was thirty-five years ago. We need to learn from whence these infections come, how they originate, and how to control them. On this score, antibiotics and the sulfonamides have failed.

Thirty years ago streptococcal infections plagued the surgeon. The antibiotics have resolved this segment of the problem of infection. Today, it is the staphylococcus, not so much feared by the surgeon of thirty years ago, that constitutes the real threat in thwarting the surgeon's efforts.

Strict aseptic precautions, alertness to needle pricks in gloves, absolute hemostasis, wound irrigation with saline solution before closure, and gentle handling of tissue during operation—all these are important in the conduct of operations. No effective measures are yet available, however, to render the atmosphere of the operating room theatre innocuous. This, too, must come if an uncomplicated convalescence is to be the order of the day, even after large operations. When, through the benisons of research, it becomes possible to predict the healing of clean wounds with almost mathematical certainty, then operation will be less of an ordeal for the patient—yes, it could come to be a recollection not wholly unpleasant.

A CLINICIAN'S VIEW OF RESEARCH FORTY YEARS AGO

When I was a student in the outpatient clinics, occasionally one heard allusions to the research worker as a person who had bought a few white

rats and a typewriter and now was busily engaged in writing his way up the academic ladder. Even the originator of the resentment inherent in that remark knew there was an element of exaggeration in the suggestion. Yet, today, a modicum of truth is still expressed therein. Ascent up the steep academic pathway without publication, as every young surgical aspirant knows, is virtually impossible. However, the most elementary technics of detection can distinguish the man who is completely absorbed in his work from the one who keeps his eye continuously on advancement up the next rung of the academic ladder.

In discussing recently with a well-known medical editor the differences in attitudes between authors and editors, it surprised me not a little to hear my friend say that authors are interested primarily in themselves; that the editor's chief interest concerns the reading public. The latter portion of my friend's statement may be true. However, as far as the first criticism is concerned, I have the distinct feeling that the dedicated investigator is motivated primarily by a passionate interest in his subject and its furtherance; that this interest transcends selfish considerations, even though he will admit a keen interest in priority of publication relating to the researches of his own group.

IMPORTANCE OF THE EXPERIMENTAL LABORATORY IN TRAINING THE SURGEON

During my study year abroad (1927-28), I had the opportunity of seeing much surgery nicely performed in many university clinics. It was easy to fall victim to the spell imparted by the great breadth of knowledge of some of the representatives of the Teutonic school of surgeons. The erudition typified by such men as Bier (Berlin), deQuervain (Berne), Eiselsberg (Vienna), Enderlen (Heidelberg), Guleke (Jena), Kirschner (Tübingen), Küttner (Breslau), Lexer (Freiburg), Payr (Leipzig), Sauerbruch (Berlin), Schmieden (Frankfurt), Sudeck (Hamburg), and Voelcker (Halle) was a revelation and an exciting experience for an itinerant student from an American surgical clinic of that day. Armed with warm letters of introduction from Dr. William J. Mayo, it was not difficult to get to the *Geheimrat*, a person who in some clinics was not easy of access to foreigners and especially Americans. Memories of post World War I eviction of German surgeons from membership in the International Society of Surgeons still rankled them. Germany, they knew, was first in science if not in war.

Recollection of pleasant and instructive visits to the clinics of the great galaxy of accomplished Continental surgeons of that period is still a heart-warming experience. However, as I became better acquainted with the surgical staffs of German surgical clinics, it worried me not a little to note that when a young surgical aspirant after years of long struggle became a full professor in his early or mid-forties, he promptly began devoting the greater portion of his time to private practice; that he often professed little or no interest in the experimental laboratory, and his major interest, despite his great erudition, related to technical improvement of operations. In fact, as I went about from clinic to clinic on the Continent, largely in Germany, though the larger portion of my *wanderjahr* was spent in Berne, Switzerland, I inquired about experimental surgical laboratories. Only one did I see—that of Professor Eugene Enderlen at Heidelberg.

As I look back now after these many years, I have the impression that Enderlen represented German surgery at its best. Skillful surgeon, well-informed and informal teacher who attracted pupils, keen investigator completely absorbed in the work of his clinic, Enderlen went directly from an operation on a patient to an operation under way in the experimental laboratory. When his patient was ready in the operating theater, Enderlen calmly left the laboratory, deposited his pipe, which he had been puffing in the laboratory, upon a shelf and went back to the operating theater to complete the next task, after which he would return again to the laboratory. Those who accompanied Enderlen about will remember that he flexed his head forward, grasping the pipe-stem firmly in his teeth, and succeeded in placing his pipe upon the shelf without touching it with his hand. When he came back to the laboratory an hour or more later, he would seize it in the same manner.

When I asked surgeons on the Continent about their experimental laboratories, I was told that such laboratories were used only for the elucidation of a specific problem and could then be made available for the purpose. Even Sauerbruch in Berlin (previously in Marburg, Munich, and Zürich), who was known to American surgeons as a great experimentalist, did not have a research laboratory in constant use. When Sauerbruch, at the beginning of his career, was a pupil of Mikulicz in Breslau, no experimental laboratory was available to him; he did his research upon the closed negative pressure cabinet for intrathoracic operations in an unused basement room.

In Vienna, too, Eiselsberg had no regular experimental laboratory which he and his pupils used continuously to lend impetus to research. When a problem posed itself, a room would be set aside somewhere for its exploration. And so it was in Billroth's time, as far as I could learn. In Edinburgh, on the contrary, David Wilkie emphasized the place of the experimental laboratory in extending the training of surgeons. Such a laboratory, I felt then and even more strongly now, can set the tone of a clinic.

Today, the importance of experimental laboratories in the training of surgeons is generally appreciated everywhere in this country. Halsted set the pattern. He recognized its great importance in the elucidation of problems as well as for the development of surgeons. More or less continuously during his long years at The Hopkins, Halsted worked away at some problem with one or two young assistants. It must have been a rewarding experience for the surgical house officers as well as their teacher. It was undoubtedly this type of atmosphere that the brothers Mayo wished to capture when they brought Frank Mann from the University of Indiana to the Mayo Foundation forty years ago.

Our surgical laboratories. When Millard Hall was built on the medical campus in 1914, the Department of Surgery enjoyed spacious laboratories for its day. Students of my time will remember that, besides the entire fourth floor, much of the space on the second floor was used for experimental surgery and departmental offices. When I became a member of the surgical staff in 1926, my early experiments on bowel obstruction were conducted on the second floor. When I returned from my European study tour, I found that our laboratories there had been given over to the Department of Bacteriology, which had taken on independent departmental aspirations after it came over from the Department of Public Health on the other side of Washington Avenue.

Thereafter, until 1954, the fourth floor of Millard Hall housed the combined experimental laboratories of the Department of Surgery. For the pre-World War II period, they were sufficiently large for most purposes. With the great growth of the staff which came after the end of World War II, these laboratories became inadequate. Our present research area by contrast is a great improvement, but is still much too small to meet our needs.

Can a surgeon today grow to full maturity and competence without having spent some time in a laboratory? Not alone does he improve himself technically, but the wrestle and conflict with

unsolved problems there increase his resourcefulness and sharpen his mind. Perhaps these by-products of the young surgeon's period of training in the laboratory are equally, if not more, important than the significant enlargement of surgical knowledge which comes from the exposure.

It would obviously be impossible to train 50 graduate students in general surgery were it not for the important help afforded by our research laboratories. Moreover, it has been a source of great satisfaction to me to note how anxious and willing graduate students in surgery are to leave the hospital service in order to spend a year or two in the laboratory.

Over a period of many years, it has been the good fortune of the Department of Surgery to have the privilege of sending some of its more promising academic prospects to the Department of Physiology for a year or more of training under the tutelage of Dr. M. B. Visscher and his staff. This innovation has paid off handsomely in the opportunities which the interchange has provided some of our surgical trainees. In consequence, the contributions of many of these young men have taken on a special physiologic interest. This plan, save for the interruption of World War II, has been in continuous operation for more than twenty years. The succession of men who have been privileged to have their thinking disciplined by exposure to physiologic technics has been very important in the growth and strength of our department.

When, in 1930, the administration of this University, through kind and generous representations of my preceptor, Dr. Arthur C. Strachauer, and Dr. Elias Potter Lyon, dean of the Medical School, permitted me to take over the direction of the Department of Surgery, we had the identical number of hospital beds in surgery that we have today. There was no sharp partition in the various surgical specialties as now. In those days, one surgical fellow alone carried the multiple inter-related responsibilities and tasks of patient-care between interns and staff. Obviously, his time was absorbed almost entirely in operating and in assisting the staff at operations. I recall proposing to our surgical fellow of that period that we add another surgical fellow on the service to aid in getting all the daily tasks of patient-care done. It is an understatement to indicate that he was not enthusiastic over the suggestion, and that he felt his opportunity would be badly compromised if another fellow was appointed. This is less than thirty years ago, and today in general surgery alone at the University Hospitals, we have 50 fellows! The budget

of the department, however, carries only 8. For the remainder, the director and some of his associates have had to look afield for the necessary support. In earlier days, for many reasons, it would have been impossible to subdivide opportunity in this way, let alone find the money for the support.

THE INVESTIGATOR AS TEACHER

More and more the importance of exposure of undergraduates to teachers who spend some of their time in research is being recognized in our universities — not because these men know more or as much as good clinical teachers in the same area of interest, but because teachers who are engaged in conflict with unsettled problems offer a fresh point of view which is stimulating and challenging. The primary purpose of the teacher is to arouse the student's interest. By the time a student reaches the stage of maturity demanded in a professional college, probably the most important thing that can be done for him is to provide an incentive that will whip up his own enthusiasm to drive him on to instruct himself. An aroused passion for the enlargement of one's knowledge makes the learning process easy.

In my student days, more emphasis was given didactic lectures than now. In the clinical field, our instructors were, with few exceptions, part-time teachers, often very competent persons well versed in their assigned topics, who spent their time largely in the active practice of their respective specialties. Teachers who affected an interest in probing the unknown in their areas of special interest were to come later, with the accession of more full-time teachers to clinical staffs.

It was President George Vincent who reaffirmed the objectives and animated the life of this University by bringing men into many of its departments who infused the spirit of research and inquiry into the teaching responsibilities of their respective staffs. In 1917, Vincent suggested the appointment of a commission to see why our Medical School was in the doldrums. Shortly thereafter, Vincent left to head the Rockefeller Institute. His successor, President Lcroy Burton, appointed Frank Billings (Chicago), J. M. T. Finney (Baltimore), and Victor Vaughn (Ann Arbor) a committee to examine the reasons for the static condition of our Medical School. Their report was filed with our regents in 1923. It said in substance: Two things are much needed here: full-time men in the clinical departments and better facilities.

Lotus Delta Coffman, who became president in 1921, and Dean Elias Potter Lyon, one of Vincent's early appointments in the Medical School

(1914), began systematically in the twenties to apply the remedies which Vincent had sought. Harold S. Diehl, one of the great among the deans of this country, has continued the important labors which Lyon initiated. With helpful and strong support from Dean Guy Stanton Ford and his successor, Theodore C. Blegen, in the Graduate School, complemented by sympathetic aid and attitudes from a succession of great presidents (Ford, Coffey, and Morrill), the deficiencies in the school which Vincent recognized have been greatly repaired. Today, if Vincent were here, he would, I have the feeling, give a friendly nod of approval to the regents, our legislative body, and the citizens of Minnesota for the vigor and renewed life which their support has brought the Medical School.

The strength of this department has come to depend upon young men who have manifested capacity for intellectual growth and who have been lured on by the attractions of an academic life. In many a university, the available staff positions have come to be looked upon as fixed. It is a pleasant duty to acknowledge here the kindly reception that suggestions for new appointments of men of unusual promise have received at the hands of Dean Diehl and President Morrill. Not so many years ago, a university president from one of our neighboring states came to spend a day on our campus and to discuss with some of us the problem of his medical school. At luncheon, Dr. Morrill took pains to point out that when a man had academic leanings and unusual capabilities, our University left no stone unturned to provide an opportunity for him, even though the situation had to be managed "on a shoe-string basis." This is one reason that the University as a whole and its Medical School continue to grow in stature.

RESPONSIBILITIES OF THE SURGICAL TEACHER

Having observed in Germany how frequently ascent to the headship of a department dealt an overdose of anesthetic to the scientific aspirations of a promising academic surgeon, I decided that if the opportunity to build a department of surgery ever fell to my lot, I would see to it that the pursuit of private practice was relegated to a secondary position. To render a good brand of professional service to patients entrusted to one's care, to develop a strong teaching program—these are the primary tasks of all full-time staff members of university clinical departments. I also came early to believe that efforts directed at exciting the interest of young men in research while pursuing acquisition of their surgical training would develop a stronger and a

better product than would predominant emphasis on clinical pursuits alone.

In a sense, it has not been too difficult in our Medical School to enlist the interest of young surgeons in research, inasmuch as every surgical fellow is required to register in the Graduate School and to work toward a graduate degree. I can still remember what a tremendous handicap I believed this requirement to be when I entered the surgical residency training program. Later, when I met men of my own age at meetings, where residency plans of training were in vogue, I found it difficult to explain to them the advantages of our plan. As the years have gone by, however, it has become quite clear to me that it is an enormous advantage to have this hurdle obstacle course. In my own instance, had it not been for this exposure to research which made it necessary to struggle with an experimental project, I probably would never have learned how exciting research could be. Transition from rejection to acceptance we all experience in several things many times in life. It is always a trying period and often one of acute suffering. But how else are men made strong? In this scheme of things, I believe, lies one of the ingredients which has fostered a spirit of research in our Medical School.

It is in those institutions with a keen and contagious interest in research that the learning process is most likely to catch on among students at every level. To have the opportunity of observing developments in the making, I am certain, constitutes a tremendous challenge for young men. To be a first-hand witness or a participant in the struggles of an investigative endeavor breathes life into the dry and uninteresting task of piling fact upon fact. A teacher, interested in research, cannot fail to communicate some of his enthusiasm to his students. It is a healthy and stirring atmosphere in which to live.

NEW DEMANDS UPON DEPARTMENT HEADS

An experience toward the end of World War II made an important and indelible impress upon my mind. I can recall asking a promising young surgeon who had been with me for a few years to come in to discuss his work. The time was late December. I was able to tell him that, through a fortunate circumstance, it was going to be possible to change his status from a surgical house officer, earning in the area of \$1,800 a year, to that of a special fellow, which would provide a stipend of \$3,600 a year. For a moment he looked at me somewhat incredulously. Then tears began to roll down his cheeks. He said to me, "Now, I can buy my wife a Christmas

present." This surprise remark suggested the need of terminating our discussion somewhat abruptly lest my feelings find similar expression.

The development of a clinic depends essentially on the choice of good men, reasonable conditions of work, and encouragement by the spoken word as well as sufficient remuneration to allow them to subsist without incurring large debts that will mortgage their futures. The young man who finds pursuit of knowledge a satisfying and rewarding experience, who finds himself growing in intellectual stature, is anxious to continue ascending the academic ladder. In a warm and stimulating atmosphere, he will strive to the utmost to do his very best, often exceeding his own as well as his teacher's expectations for him.

Members of my graduating class in medicine (1921) may remember that in our years in Medical School only 2 men in our group of 78 persons were married. Times, of course, have changed and probably will change again. In the Halsted days at Hopkins, very rarely, if ever, did a surgical house officer marry while he held his post.

To the roles of surgeon, teacher, and investigator, the titles of regimental water carrier and sideline cheer-leader also should be added to the primary duties and responsibilities of the surgical professor. I have a feeling that these two latter present-day demands upon the time of a departmental head in a university clinic may be equally, if not more, important than some of the other areas of competence which the professor is expected to represent.

EMOLUMENT OF THE UNIVERSITY SURGEON

When I first became a member of the Department of Surgery, virtually all our hospital patients were charges of their respective counties and the state. There were a few per diem patients, defraying the cost of their hospitalization. The only private patient, more accurately called a free patient, was a sick intern or nurse. In 1921, the regents of the University authorized admission of private patients under specified conditions into the University Hospitals.

Prior to World War II, private patients on the wards of the University Hospitals were very few. The coming of many well-equipped Hill-Burton hospitals scattered geographically through the state keeps a large number of patients, who in earlier days would have come to a university clinic, in their own home areas, where satisfactory professional care is available. This circumstance, together with the fast growth of health insurance programs, which include a

large fraction of employed adults in our state, has altered considerably the type of case admitted to the teaching wards of the University Hospital. When almost all hospital patients were wards of the state and county, it was a far simpler matter then than now for a departmental chairman to effect a partition of cases among members of his staff. This item is a matter of great significance in the development of young men as well as strong departments. Medical schools need, therefore, to study carefully and lend serious heed to this very important item of case partition in clinical departments. It is still probably one of the most important functions of a clinical chief.

In consequence of these occurrences, the number of county supported cases has decreased, and, as the number and the competence of the full-time staff of the hospital has increased, the number of private patients in the hospital has, of necessity, increased. It would be relatively easy, therefore, for a full-time staff member, with acknowledged competence, to use his office as a high road to private practice. However, in this department, most of our staff have sought to delimit their income from professional private patients to keep well within the bounds of a true university academic atmosphere. In fact, an active and important source of support for research in this department has come from the generous actions of members of the staff who have regularly contributed liberal sums to the department to help support research and keep the departmental activities going. The entire staff recognizes the unusual and wonderful opportunities it is enjoying. It is the primary creed of every university teacher to consider opportunity, beyond support of a modest scale of living, to be his more important emolument.

In his diary, January 14, 1851, Macaulay records a conversation at dinner with the Prince of Windsor, Albert, Queen Victoria's consort. A chair of physic was to be filled at Cambridge. This is what Macaulay wrote concerning that interchange.

I had a few words with the prince about the Regius professorship of medicine at Cambridge, now vacant by Haviland's death. I remarked that it was impossible to make either Oxford or Cambridge a great medical school. He said, truly enough, that Oxford and Cambridge are larger towns than Heidelberg, and yet that Heidelberg is eminent as a place of medical education. He added, however, something which explained why this was. There was hardly, he said, a physician in Germany, even at Berlin, even at Vienna, who made one thousand pounds a year by his profession. In that case, a professorship at Heidelberg may well be worth as much as the best practice in the great cities. Here, where Brodie and Bright make more than ten thousand pounds a year, and where,

if settled at Cambridge or Oxford, they probably could not make fifteen hundred pounds, there is no chance that the academic chairs will be filled by the heads of the profession.

Times have changed. Even the clinical professor today, I am certain, would rate opportunity as being a far more important desideratum than a large practice. In fact, the trend of placing ceilings on the earnings of university professors from practice must come about in all professional colleges if a true university spirit with emphasis on the advancement of knowledge is to prevail.

HALCYON DAYS FOR MEDICAL RESEARCH

Our successors in the medical schools of our country, I would like to believe, will continue to receive the generous support from voluntary agencies that has been our privilege since the days following World War II. Then began a country-wide phenomenal spirit of intense concern over matters of health which captured and retains the public interest. The citizens of Minnesota, who have always manifested a keen interest in the educative process, also have come to appreciate more fully the great and increasing importance of research. Philanthropically-minded generous individuals throughout the breadth of our land have come forward to lend impetus to research, and the American public, generally through the United States Public Health Service, the American Cancer Society, the American Heart Association, and other voluntary organizations, have given a forward thrust to research in our American medical institutions such as has never occurred before during the history of the world. These have been wonderful days to live through. It is important that we who enjoy the opportunities provided by the hospital clinics of our medical schools and universities appreciate fully the great privilege which is ours. It is in a spirit of great humility and with warm feelings of grateful thanksgiving, therefore, that I embrace the opportunity to say how wonderful it has been to have had the privilege of having the responsibility for the direction of a surgical clinic during these halcyon years.

Our legislative body of the great state of Minnesota has dealt liberally with its University. The sense of appreciation of what training, learning, and research mean perhaps is nowhere in the world more fully appreciated at the level of the average citizen than here in Minnesota. If the citizens of Minnesota want their Medical School to continue in the vanguard of progress during the years which lie directly ahead, a spirit of liberal giving by a larger number of our successful citizens must come about to help carry the heavy burden of the financial support which

research needs and merits. In the final analysis, every public institution is a voluntary agency. Even a state-supported enterprise, that serves a worthwhile purpose and enjoys the approbation of the community or of a wider circle, must enjoy the privilege of sharing more often in the generous philanthropy of public spirited citizens.

Research and research training have come to be an exportable product in this country. The public is playing an important role in helping American medical institutions pay off a great debt to European medicine.

PHYSICIANS AND THE INTERNATIONAL SCENE

Will a generation of men and women ever come to live a long life without enduring a war? During recent years we have all come to view world affairs as bearing more directly upon our own problems. Isolationism probably has gone forever. A conflict in Egypt, Thailand, or Jordan, we have learned, can affect our own fortunes very directly.

The American people have been involved in three major conflicts, even though one of them was called an incident (Korean War) during my years at this University. What if all this cost in effort and lives could have been expended upon man's improvement rather than upon his destruction? Must there be apathy if there is no war? I find it not difficult to believe that medical men with the experience, stature, and unusual qualities of a Paul Dudley White (alas, only too few!), Howard Rusk, or a Charles Mayo could come to exercise an important influence in redirecting man's outlook upon the international scene. The man of broad interests who has healed one's brother or neighbor in a serious illness has a technic of reaching the troubled heart and mind unknown to the negotiator. I believe that our State Department could use such talent in reaching the minds of those with whom they have been unable to communicate effectively.

Wars obviously have had a large influence on the growth and development of medicine and surgery. Can medicine come to have an influence in thwarting the occurrence of wars? I believe it can and should take steps to wield its influence in helping to bring about a warmer spirit of wanting to understand our fellow man in other areas of this troubled world. No remedy can equal the solvent action of unfeigned sympathy in dispelling the perplexing anxieties, cares, and vexations of life. When will the nations of this earth come to consider themselves as one people whose fortunes rise or fall with any others?

TOTAL PANCREATECTOMY

5 Cases Illustrating Indications and Problems of Management

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THE FIRST AUTHENTICATED PERFORMANCE of total pancreatectomy in the human being was that reported by Rockey¹ in 1943. The operation was for an extensive carcinoma involving a large portion of the gland. Rockey's patient survived for fifteen days. Priestley² reported the first successful total pancreatectomy the following year. His patient had hyperinsulinism and, though no gross tumor could be demonstrated at the time of the procedure, the specimen contained a very tiny adenoma. This patient has been the subject of extensive and important metabolic studies and is still living today.³ Fallis^{4,5} is credited with having performed the first successful pancreatectomy for a malignant lesion in 1944. This patient survived fourteen months. The earliest report of the performance of this procedure for chronic relapsing pancreatitis is contained in a report from the Mayo Clinic in 1946,⁶ which included such a case that had been carried out two years previously by Dr. Clagett. No single surgical center has reported a large series of total pancreatectomies. This can be attributed to the very serious metabolic disturbances which result from the operation as well as the failure to demonstrate prolonged cures when the operation is applied to the management of malignant lesions. In their book, Cattell and Warren⁷ collected 33 cases from the world's literature including three of their own. Of these, 11 survived the operation. No survivals over fourteen months had been reported in operations for cancer, and these authors concluded that the mortality had been too high and the survival rate too short to justify its application to carcinoma of the pancreas, with the possible exception of its performance in a few centers where careful investigation was in progress. The fact remains, however, that total pancreatectomy is the only operation which is applicable to the

curative treatment of at least two clinical situations. These include hyperinsulinism resulting from multiple islet-cell adenomata and carcinoma involving a greater portion of the pancreas than can be removed by the more conventional operations of radical pancreatoduodenectomy or distal pancreatectomy.

Certain metabolic peculiarities of the totally pancreatectomized human being have been consistently reported. Among these has been the finding that the insulin requirement of these individuals is much lower than that which characterizes many cases of clinical diabetes.^{1-6,8-12} The patients never require more than 30 to 40 units of insulin per day and frequently are maintained on considerably less. The mechanisms of this are discussed below. The digestive impairment which accompanies total pancreatectomy has also been studied in detail in the previously mentioned patients of Priestley, Dixon, Fallis, and others. Though the findings in the cases reported here are quite similar, there is evidence that the impairment of fat absorption following radical operation is not related exclusively to the removal of the pancreatic tissue, and other aspects of the procedure, such as the amount of stomach removed, also play a significant role.

SURGICAL CASES

Multiple islet-cell adenomata. The occasional necessity for the total removal of the pancreas in the management of hyperinsulinism is illustrated by the following cases.

Case 1. H. A., a 61-year-old woman, was first operated upon in 1947 when a distal pancreatectomy was performed for characteristic symptoms of hyperinsulinism which had existed since 1942. Multiple islet-cell adenomata were found in the specimen. The relief of symptoms was only temporary, and hypoglycemia reappeared with fasting blood sugars running as low as 13-mg. per cent. Since this patient was totally blind from an unrelated cause, the hardship posed by rendering her diabetic would be serious, and we were not willing to proceed with elective resection of the remainder of the pancreas. For this reason, she was treated with ACTH

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and, subsequently, with oral cortisone, a regimen which proved adequate to prevent symptomatic hypoglycemia. In May 1955, however, when she developed very severe hemorrhage from a duodenal ulcer, steroid therapy had to be discontinued. Pancreatoduodenectomy with total removal of the pancreas was then carried out. During the twelve hours after the operation, her blood sugar went from profoundly hypoglycemic levels to over 900-mg. per cent, and diabetic coma was precipitated. With adequate management of this complication, however, she did well and at the present time requires in the neighborhood of 30 units of insulin. She handles her diabetes herself and is in a far more satisfactory metabolic status. The resected specimen of her gland again showed multiple islet-cell adenomata, one of which is depicted in figure 1. Her lipid absorption has been studied by the use of a test meal of radioiodinated triolein by means of which assimilation can be measured in terms of blood radioactivity at intervals after injection of the labelled fats.¹³ Surprisingly, her uptake in five hours is nearly 50 per cent that of a normal control. This is an interesting finding in view of the fact that a number of patients with the Whipple type of operation, in which only the head of the pancreas has been removed, have displayed a much greater impairment. Presumably, the explanation in this case rests in the fact that rather minimal resection of the distal stomach was required.

Islet-cell carcinoma. It is very unusual to find malignant tumors of islet-cell origin in a stage wherein radical surgery is feasible. Cattell reported only one such case in 88 instances of radical pancreatoduodenectomy.⁷ It is surprising, therefore, that in the present series of total pancreatectomies, the only malignant tumor which arose from pancreatic tissue was such a carcinoma (case 2).

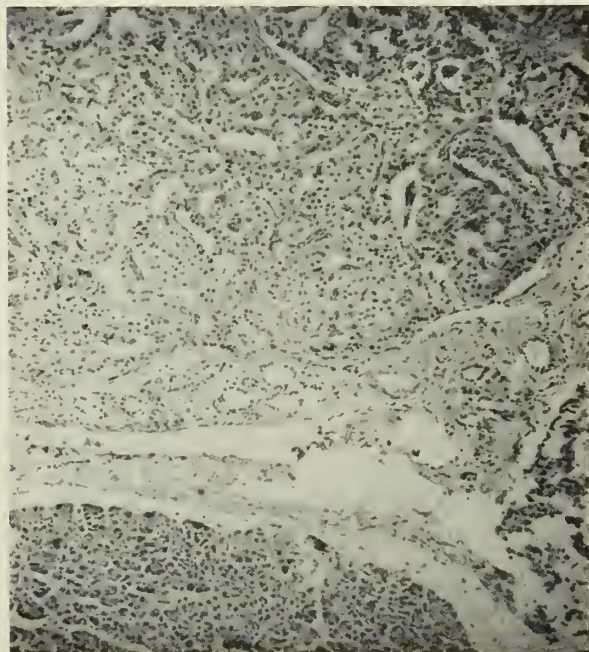


Fig. 1. Case 1. Section through adenoma removed at second operation for multiple islet-cell adenomata.

Case 2. F. M., a 69-year-old man, was operated upon elsewhere for cholecystitis at which time a stony hard mass was felt in the head of the pancreas. On exploration at University Hospitals, the presence of this mass was confirmed. Since the tumor appeared to extend beyond the usual line of resection at the neck of the pancreas, it was apparent that a standard radical pancreatoduodenectomy could not be done, and a total pancreatectomy was carried out. At the conclusion of the operation, however, it was felt that a small portion of residual tumor was left on the portal and superior mesenteric vein. The operation was performed on July 6, 1956. The postoperative course was complicated by a pulmonary embolism from which he recovered. Since returning home, he has required only 14 to 15 units of insulin daily.

Spread of tumors from the ampulla and pancreatic head. It is difficult to determine on the basis of inspection the extent of tumors which arise in the head of the pancreas and ampullary region. Tumor cells are apparently readily seeded throughout the substance of the gland, creating a microscopic deposit which cannot be grossly identified. Furthermore, tumors which obstruct the pancreatic ducts invariably result in distal pancreatitis, fibrosis, and areas of tumefaction which are indistinguishable from neoplasm. This has led us to the conclusion that total pancreatectomy is occasionally justified under circumstances wherein the tumor cannot be clearly localized in the region of the head of the pancreas. Although this problem might be expected to arise more frequently in tumors arising in the acinar substance of the gland itself, it occurred in two instances of ampullary carcinoma.

Case 3. L. LaB. was an 80-year-old woman who had been diabetic for two years. This had been controlled by diet alone, and she had never taken insulin. Prior to admission, she had suffered weight loss for two months and had had jaundice and pruritus for two weeks. Clinical examination revealed a palpable gallbladder, and there was typical laboratory evidence of extrahepatic biliary obstruction. At operation, a large tumor was found in the ampulla of Vater invading the head of the pancreas. The body and tail of the pancreas were fibrotic and atrophied, and the pancreatic duct was hugely dilated. Since this, in addition to the presence of diabetes, suggested that the tumor had spread beyond the limits of the conventional pancreatoduodenectomy, a total pancreatectomy was undertaken. Histologic examination of the specimen justified the operation. Figure 2 shows a section taken from the tail of this pancreas with scattered tumor cells interspersed among fibrous tissue and pancreatic elements. Postoperatively, she did very well. She required 9 gm. of pancreatin daily to prevent diarrhea and maintain her body weight, but control of her diabetes was established with only 10 to 12 units of NPH insulin daily. Seven months later, she was readmitted for further evaluation of her diabetic state. During the period of this admission, she became acutely ill. Great difficulty was experienced in controlling her diabetes. She developed bacteremia and succumbed. Autopsy revealed tumor adjacent to the hepatic duct and in an internal mammary lymph node. There had been a recent myocardial infarction.

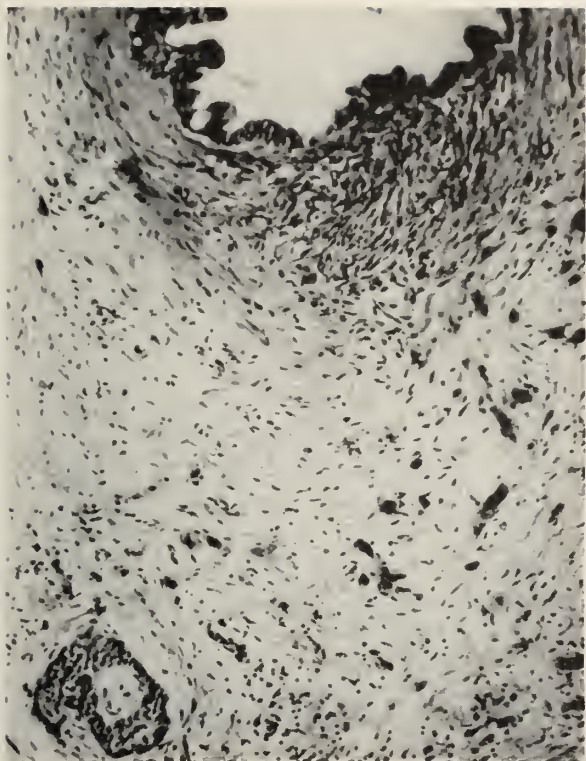


Fig. 2. Case 3. Section through tail of pancreas showing tumor cells arising from carcinoma of ampulla seeded into atrophic and fibrotic acinar tissue.

The fourth case is that of a patient with a tumor of similar origin.

Case 4. A. H. was a 49-year-old farm hand who was admitted with a history of vomiting, which roentgen examination showed was the result of an obstructing lesion in the second portion of the duodenum. He was not jaundiced on admission, although four months prior to that time an episode of jaundice had been observed. Exploration revealed a large tumor occupying the duodenum and the head of the pancreas. Secondary changes had occurred in the pancreas, and it was difficult to ascertain the extent of the tumor. In view of this, as in the previous case, a total pancreatectomy was done. Examination of the specimen revealed that the tumor arose in the ampulla and did not invade the pancreas beyond the immediate periampullary region. Postoperatively, he did extremely well and has required from 16 to 21 units of insulin per day in addition to pancreatin in doses of 9 to 12 gm. daily. At the present time, eighteen months since his operation, he is performing farm work.

Carcinoma of the common bile duct. An interesting finding, which has emerged from a recent study of tumors of the pancreas and periampullary area, has been a rather high incidence of tumors arising in the retroduodenal or intrapancreatic portion of the common bile duct.¹⁴ It is our opinion that a larger number of these tumors are currently being recognized because they are seen somewhat earlier than in previous years, and, after they have spread, it

is frequently difficult to tell by gross examination at surgery where the tumors have originated. Case 5 had such a lesion, arising in the retroduodenal portion of the common duct and extending into the head of the pancreas.

Case 5. B. B., a 74-year-old man, entered with a two-month history of abdominal pain and jaundice for two weeks. He had lost 35 lb., and, on examination, a distended gallbladder was palpable. Laboratory studies gave characteristic values for extrahepatic biliary obstruction. There was no evidence of diabetes. At operation, he was found to have a firm tumor partly arising in the region of the pancreatic head, but the borders were diffuse, and the entire pancreas was nodular and fibrotic. Again, as in cases 3 and 4, because of the strong likelihood that this tumor had spread beyond the head of the pancreas, a total pancreatectomy was carried out. Histologic examination confirmed extensive spread of tumor cells throughout the body and tail of the gland. Photomicrographs of this specimen are shown in figure 3. His immediate postoperative course was smooth, but his diabetes was extremely difficult to manage, and he experienced numerous episodes both of hypoglycemia and incipient diabetic coma. These occurred during his original admission and in two subsequent admissions, which were necessitated for regulation of his diabetes. Two months after his discharge, he succumbed to bacteremia and aspiration pneumonia. At autopsy, metastatic nodules were seen deep in the liver parenchyma. Tumor was found in the preaortic lymph nodes and metastases in the lungs. It was apparent that this man's eventual death was related to the numerous difficulties encountered in the management of his diabetes.

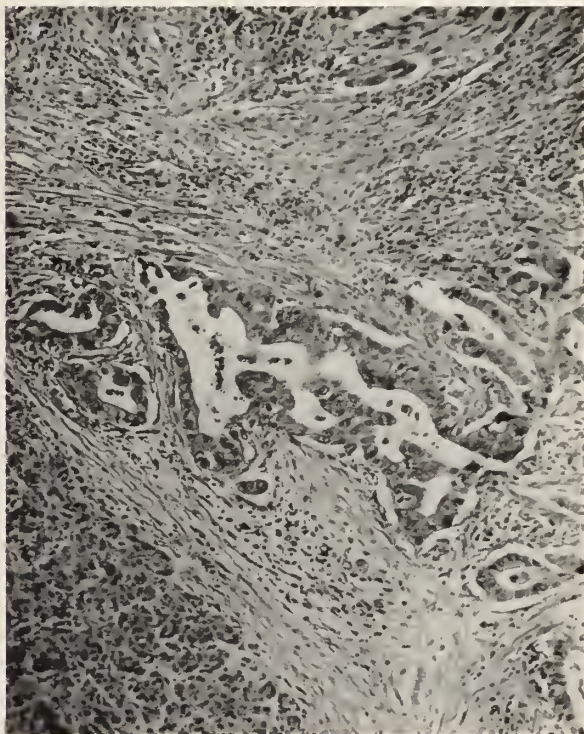


Fig. 3. Case 5. Section through distal pancreas showing spread of tumor arising in common bile duct.

Indications for total pancreatectomy. Since there are occasional instances of hyperinsulinism resulting from multiple adenomata or single adenomata so small that they cannot be grossly demonstrated, it is apparent that cases will arise in which total pancreatectomy is necessary. This is exemplified by Priestley's case and the first case in this series.² Under such circumstances, diabetes is clearly preferable to intractable hypoglycemia. Admittedly, however, such cases are rare, and, in proved cases of hyperinsulinism, a distal pancreatectomy should be done first in the hope of removing the cause of excessive insulin production. Even though this operation is frequently unsuccessful, it is relatively harmless and should be attempted first to be followed by removal of the residual pancreas by radical pancreatoduodenectomy should the initial procedure fail. In this connection, it should be emphasized that, since functional hypoglycemia is a much more common syndrome than primary hyperinsulinism, clear-cut demonstration of the latter must be made before any surgery is contemplated. It would also seem that certain malignant tumors arising in the pancreas or periampullary region extend into the body and tail and require total pancreatectomy.

Unfortunately, such spread is not easily demonstrable at operation. Several surgeons have observed tumor cells in fluid removed from the pancreatic ducts at surgery, and it would appear that the type of parenchymal spread which was demonstrated in cases 3 and 5 must have followed the route of the obstructed ducts. In view of this and the generally poor results obtained by standard radical pancreatectomy in lesions of the pancreatic head, more frequent use of total pancreatectomy has been suggested.¹⁵ We have been inclined to carry out total pancreatectomy in situations in which the boundaries of the tumor are diffuse or where the pancreas is atrophied and fibrotic, when the pancreatic duct is dilated, and when there has been recent onset of diabetes. In this connection, it should be pointed out that diabetes in association with gross lesions of the pancreas is not uncommon. We have emphasized this in the past, and a recent study of cases at the University Hospitals revealed an abnormal group of tolerance tests or elevated fasting blood sugar levels in 18 per cent of cases with carcinoma of the head of the pancreas, 26 per cent of the body and tail lesions, and 32 per cent of the tumors diffusely involving the pancreas.^{14,16}

Metabolic considerations and problems of management. The most striking characteristic of the

totally pancreatectomized human being is the relatively low insulin requirement, which has never been reported as over 30 to 40 units per day and, in many instances, has ranged from 8 to 12 units, lower amounts than are seen in many cases of naturally occurring diabetes. Though the insulin requirement is low, it should not be assumed that pancreatectomized patients are simple to manage. With relatively low requirements, these people are extremely insulin-sensitive, and severe hypoglycemic crises are a frequent problem. Furthermore, it is important that they receive enough insulin, because inadequate dosage invariably results in mounting ketosis, and diabetic coma seems to develop with extraordinary rapidity. This narrow therapeutic range creates a difficult and exacting problem.

Certain experimental observations have thrown some light on the nature of this rather puzzling metabolic picture. In 1945, Thorogood and the author¹⁷ carried out a series of experiments on dogs rendered diabetic by alloxan, which destroyed only the beta cells of the islets of Langerhans. After preliminary metabolic studies, some of these animals underwent ligation of the pancreatic duct and others, total pancreatectomy. Whereas ligation of the duct had little effect on insulin requirement of alloxan-diabetic animals, pancreatectomy reduced the requirement to about one-third of its preoperative value. The theory proposed at the time was that the hypoglycemic factor of the pancreas, which was presumably produced by the alpha cells, was present in the alloxan preparation and tended to elevate the insulin requirement and that the source of this substance was subsequently removed by total pancreatectomy. Subsequent experiments on the hyperglycemic factor in the pancreas tended to confirm this, as did the finding by Sutherland and de Duve that extracts of alloxan-diabetic, duct-ligated pancreas contained the hyperglycemic-glycogenolytic material.^{18,19} Another significant finding, however, which emerged from a comparison of the two types of diabetic preparations, related to the susceptibility to ketosis. Whereas the alloxan animals lived for a long time without ever developing serious ketosis after pancreatectomy, mounting ketosis and rapidly fatal acidosis ensued when insulin was withheld. In earlier experiments on ketotic dogs, we were unable to demonstrate that a hyperglycemic material also had an anti-ketogenic action. However, subsequent experiments by Kalant did demonstrate such an effect on ketosis in fasting rats,²⁰ and recently work from this laboratory has shown a temporary inhibition of ketosis in pancreatectomized patients

during the infusion of glucagon.^{21,22} It would seem, therefore, that both the low insulin requirement and the high susceptibility to ketosis may be related to the deficiency of a second factor which is not adequately replaced by the administration of insulin. Because of the short action of hypoglycemic material, no method has yet been developed for incorporating it into the management of totally pancreatectomized patients.

Obviously, severe absorptive disturbances follow total pancreatectomy and require replacement with a source of pancreatic enzymes. It is of interest, however, that even in the conventional radical pancreatoduodenectomy, when the body and tail of the pancreas are left in place and adequate restoration is made of the continuity between the pancreatic duct and intestinal tract, many patients will show evidence of pancreatic insufficiency. In a series of studies which has been reported previously, fat absorption in these patients has been compared using the radioiodinated test meal.²¹ The defect in absorption did not bear a close relationship to the amount of residual pancreas or to the means of restoration of the pancreatic duct. As has been mentioned previously, the first patient of this series displayed better fat absorption than some in whom the body and tail were not removed. It would appear that the amount of stomach which is removed has an important bearing on this, and a relatively small absorptive defect may result if only a minimal gastrectomy is done in association with removal of the pancreas and duodenum.

All patients with total pancreatectomy are nevertheless greatly improved by the inclusion

of pancreatin in their diets. This is best given with meals, and the inclusion of pancreatin even with "snacks" seems to be important.

SUMMARY

1. Five consecutive cases of total pancreatectomy are reported with no operative deaths.

2. The indications for total pancreatectomy include certain instances of hyperinsulinism, in which repeated operations demonstrate no single tumor, and cases of carcinoma of the pancreas and perampullary region which have spread beyond the head of the pancreas.

3. Since spread of tumors in this area is frequently difficult to determine by gross examination at surgery, total pancreatectomy seems justified when the borders of the tumor are indefinite, when the pancreas is atrophied and fibrotic, when the ducts are dilated, and when there has been recent onset of diabetes. Spread of the tumor by way of the obstructed pancreatic ducts has been demonstrated.

4. Pancreatectomized patients display low requirements for insulin but are very susceptible both to hypoglycemia and to ketosis. The relatively narrow therapeutic range for insulin dosage creates a difficult problem of management. A possible mechanism for this lies in a second pancreatic hormone which at present is not included in the replacement regimen.

5. Although the absorptive defects vary greatly, depending among other factors on the portion of stomach removed, all patients with total pancreatectomy should be maintained on large amounts of pancreatic enzymes taken with meals.

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Early Detection of Cancer

A Nine-Year Study

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THE POPULATION OF THE UNITED STATES now approximates 170,000,000 people. If the present trends continue, cancer will develop in 42,000,000 of these persons some time during their lives. At present, one-third of cancer patients can be cured using current methods of therapy. However, probably one-half to two-thirds *could* be cured using the same therapeutic methods if diagnosis of serious visceral cancers in the asymptomatic stage became possible on a large scale.

No longer is there doubt about the reality of an increased amount of cancer in our population. The ranks of the more cancer-susceptible members of our population are expanding. The number of persons in this country 40 years of age and over has increased from 23.4 per cent in 1900 to 35.3 per cent in 1950. Moreover, deaths from cancer are increasing continuously. Today, cancer is the second leading cause of death not only in adults but also in children.

The picture is not entirely gloomy, however, for, in our experience, it is possible to increase survivors in direct proportion to the earliness of detection of the most serious visceral malignancies. Currently, prophets of doom have spawned a new excuse for procrastination and have put forth the concept of "biologic pre-determinism;" yet, our data strongly support the value of the earliest possible diagnosis of malignant disease.

The Cancer Detection Center was organized at the University of Minnesota nine years ago as a cooperative enterprise of the State Cancer Committee of the Minnesota State Medical Association, the Minnesota Division of the American Cancer Society, and the Department of Surgery, University of Minnesota Hospitals. Its basic purpose is to appraise methods enabling doctors

to diagnose cancer still in the asymptomatic stage. The only prerequisites for enrollment are: (1) legal residency in Minnesota, and (2) lack of symptoms that would ordinarily require a physician's services. In addition, age limitations are imposed—45 years and over for women and 50 years and over for men—to select the segment of population in which the greatest proportion (90 per cent) of all malignancies occur.

METHODS OF PROCEDURE

Prior to admittance, each patient fills out a questionnaire regarding vital statistics, past history, and a system review. Minor symptomatology may thus be evaluated. If there is indication that the patient is truly symptomatic on arrival at the Cancer Detection Center, examination is refused, and that individual is immediately referred to his own physician for evaluation.

Preparation for examination includes a three-day meat-free diet, overnight fasting, and enemas to permit proctosigmoidoscopic inspection. The examination requires one day and includes the following procedures for every patient: gastric analysis, proctosigmoidoscopy, pelvic examination with Papanicolaou smears (females), E.N.T. examination with indirect laryngoscopy, general physical examination, complete blood count, urinalysis, testing of stool for occult blood, and a chest roentgenogram (14x17 film).

Additional special procedures are done as indicated:

1. An upper gastrointestinal x-ray is ordered under the following conditions:

- a. Achlorhydria or hypochlorhydria less than 30°.
- b. A hemoglobin below 11.0 gm. without obvious explanation.
- c. The presence of 3 or 4+ occult blood in the stool.
- d. Symptoms which might in any way be related to cancer of the stomach.
- e. A strong family history of gastric cancer.

2. A barium enema is ordered if:

- a. Polyps or suspicious lesions are present on proctosigmoidoscopy.

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- b. A hemoglobin below 11.0 gm. without obvious explanation.
- c. The presence of 3 or 4+ occult blood in the stool.
- d. Symptoms which might in any way be related to colonic cancer.
- e. A strong family history of colonic cancer.

As we have stressed repeatedly, there is no procedure or examination routinely carried out at the Cancer Detection Center which cannot easily be performed in any doctor's office or local hospital.

After examination, the patient is directed to return to his own physician to whom we send a complete summary of the findings. Biopsies, further evaluation, and treatment are carried out under the direction of the private physician or a consultant selected by him. However, we do request that the patient's physician inform us regarding additional diagnostic studies, therapy, and the outcome of the cancer problem. If, after six weeks, a patient has not returned to his physician for evaluation of our examination, we send this patient a letter (a carbon copy of which is forwarded to the physician) advising him that he should do so immediately.

RESULTS

In the first nine years of operation, 8,229 patients have been examined. Almost an equal number of men and women have been seen — 3,946 men (48 per cent) and 4,283 women (52 per cent). Some patients have had only 1 examination, but since yearly re-examination is emphasized, some have had as many as 9. Altogether, 25,158 examinations have been performed; the average per patient is 3.0.

A total of 225 histologically proved cancers have been found through the Center's efforts. That is, we have found 1 proved malignancy in every 36 patients examined — an incidence of 2.7 per cent. These cancers are listed in table 1.

The order of frequency of these malignancies

TABLE 1
HISTOLOGICALLY PROVED CANCERS DIAGNOSED AT THE
CANCER DETECTION CENTER 1949-1957

	Total	Men	Women
Lip	4	4	
Floor of mouth	1		1
Parotid	1		1
Stomach	17	11	6
Duodenum	1		1
Colon	18	6	12
Rectum	22	16	6
Omentum	1		1
Lung (primary)	1	1	
Lung (metastatic)	3	2	1
Breast	25		25
Cervix	12		12
Endometrium	7		7
Ovary	8		8
Prostate	23	23	
Bladder	2	2	
Vulva	1		1
Malignant melanoma	3	2	1
Skin	57	32	25
Thyroid	5	2	3
Lymphosarcoma	3	2	1
Hodgin's and other lymphoma	4	3	1
Leukemia	6	5	1
Total	225	111	114

corresponds closely with the national pattern. Therefore, we feel that beyond the limitations originally imposed, our patients are not a specially select group. A comparison of our order of frequency with that of the state of Connecticut is made in tables 2 and 3.

Although there has been a remarkable increase in carcinoma of the lung throughout the country, we have found only 1 primary carcinoma of the lung as contrasted with larger numbers of other visceral cancers.

The significance of doing *annual* complete examinations of this detailed cancer-searching type is readily apparent when it is noted that 52.8 per cent of the cancers were found on recheck examination.

TABLE 2
CANCER INCIDENCE, MEN

State of Connecticut 1935-1951	Rank	Cancer Detection Center 1948-1957
Skin	1st	Skin
Prostate	2nd	Prostate
Colon	3rd	Rectum
Lung	4th	Stomach
Rectum	5th	Colon
Stomach	6th	Leukemia
Leukemia	7th	Lip
Lip	8th	

TABLE 3
CANCER INCIDENCE, WOMEN

State of Connecticut 1935-1951	Rank	Cancer Detection Center 1948-1957
Breast	1st	Skin
Cervix	2nd	Breast
Skin	3rd	Cervix
Colon	4th	Colon
Endometrium	5th	Ovary
Rectum	6th	Endometrium
Stomach	7th	Rectum
Ovary	8th	Stomach

Perhaps even more significant to the long-term benefit of patients in this study is the number of precancerous lesions that have been detected. In the group of 8,229 examinees, 4,279 of these lesions have been found. The abnormalities classified as precancerous and the number found are given in table 4. In addition, a very large number of benign tumors have been found. Many other conditions requiring further medical care have also been brought to the patients' attention as a result of their examination.

TABLE 4
PRECANCEROUS LESIONS

Rectal and colon polyps	2,386
Leukoplakia	589
Senile keratoses	573
Irritated pigmented nevi	394
Thyroid adenomas	240
Kraurosis vulvae	57
Gastric polyps	39
Vocal cord polyps	1
Total	4,279

The final success of this venture cannot be stated at this time, but our data clearly indicate a significant improvement in gross survival statistics. Including only the patients with visceral cancers (all patients with skin cancer are doing well), the over-all survival rate in our group is 68 per cent. This is to be contrasted with an over-all survival for the country as a whole of 25 to 30 per cent. Further, by carefully scrutinizing the patients' histories, we find that 37 per cent of those with visceral cancer actually had minor but related symptoms. Our survival rate in this group is 53.2 per cent. This is to be compared with the group completely asymptomatic at the time of diagnosis, *where the survival rate in 76.9 per cent.*

Evaluating survival by organ systems, we find that the gastrointestinal tract lesions have yielded the most remarkable results. Here, survival of the asymptomatic patients approximates three times that of the asymptomatic group. These data are listed in table 5.

In addition to the 225 malignancies detected in the Center, 119 cancers have been found by

TABLE 5
SURVIVALS IN CANCER OF GASTROINTESTINAL TRACT

Location	Asymptomatic	Symptomatic
Stomach	44%	12%
Colon	85%	20%
Rectum	81%	33%

the patients' own family physicians in the group seen at the Cancer Detection Center. Of these, 42 developed in individuals who no longer were returning for an annual examination, and 77 occurred in those undergoing routine re-examination. Thus, we have a 75 per cent chance of disclosing malignancy in our active group. Of those cancers not diagnosed at the Center, some have developed in patients no longer returning for examinations; some have developed in patients not returning to their physicians for abnormalities detected here; and some have been frankly missed by the Cancer Detection Center, either from failure to find the lesions or from failure to make proper recommendations. Table 6 enumerates the cancers that were not diagnosed at the Center and lists the reasons why they were missed.

TABLE 6
LESIONS NOT DIAGNOSED AT CANCER DETECTION CENTER

Lesions developing between examinations (No diagnostic criteria at time)	59
Skin	15
Breast and female genital	11
Genitourinary tract	9
Pancreas and biliary tract	7
Gastrointestinal tract	4
Central nervous system	3
Miscellaneous or undetermined	10
Failure of Cancer Detection Center	12
Patients failing to return to see physician	5
Physician failing to institute adequate diagnostic procedures	1
Lesions developing after patient had stopped coming to Cancer Detection Center	42
Total	119

Adequate diagnostic methods for certain organ systems are not yet available. Early diagnosis of lesions of the urinary tract, pancreas, and biliary tract, for instance, has been abysmally poor; and, until better tools are forthcoming, symptoms, unfortunately, must be relied on. In areas that are accessible to examination, such as the skin, oral cavity, gastrointestinal tract, breast, and lymphatic system, we have been much more successful.

SUMMARY

The parallelism of aging and cancer incidence produces a population group highly susceptible to this disease. A technic of finding presymptomatic cancers in this group has been outlined. The Cancer Detection Center has enrolled 8,229 patients, and 25,158 examinations have been made.

In the actively examined group, 225 cancers

have been found. The incidence of precancerous lesions is 55.6 per cent. The over-all survival rate of patients whose cancers were found here is 68 per cent. Survival in the truly asymptomatic group is 76.9 per cent, while that in the symptomatic group is 53.2 per cent. In lesions of the gastrointestinal tract, there is approximately a threefold increase in survival of the

presymptomatic group over the symptomatic group.

We are convinced that early, presymptomatic malignancy can routinely be disclosed by thorough periodic physical and laboratory examinations. There is every indication that malignancies uncovered at this stage offer increased opportunity for cure.

PROGNOSIS after subarachnoid hemorrhage is much better among patients with normal bilateral carotid angiograms than among those with radiologically demonstrable aneurysms not treated surgically. Mortality from recurrent hemorrhage is about 55 per cent among conservatively treated patients with aneurysms, but only about 5 per cent in those without aneurysms. Death from recurrent hemorrhage usually occurs within a year after the initial hemorrhage.

Disability is also less probable in patients without aneurysms. In those with vascular defects, age influences subsequent working capacity; disability is more frequent among those over 40 years of age than among younger patients. In patients with aneurysms, location of the vascular defect also influences prognosis. Mortality is greatest with lesions of the internal carotid artery and least with aneurysms of the anterior cerebral or anterior communicating artery. Likelihood of survival is not influenced by unconsciousness or occurrence of major neurologic signs during the hemorrhage, nor is hypertension a significant influence.

G. af BJÖRKSTEN, M.D., and HENRY TROUPP, M.D. Finnish Red Cross Hospital, Helsinki. *J. Neurosurg.* 14:434-440, 1957.

THE ADVISABILITY of surgical correction of aortic stenosis is determined by the condition and functional capacity of the left ventricle. When right-sided or, in most instances, left-sided failure exists, results of operation on the valve are not likely to be satisfactory. Repair may be beneficial if left ventricular failure is recent or has responded to treatment.

Angina pectoris, dyspnea, and subjective awareness of the heart's action necessitate thorough assessment of the cardiac burden. Operation may be desirable or essential if the left ventricle is enlarged or repeated electrocardiograms show deterioration. When need for operation is doubtful, right- and left-heart catheterization studies should be made. Percutaneous puncture of the left ventricle, less disturbing than atrial puncture, is a safe and quick method for determining the pressure gradient across the valve. The gradient is deceptively high only if significant regurgitation coexists. Pressure in the left ventricle and brachial artery should be measured before, during, and after surgery.

If the blind method is used in treatment of calcified aortic stenosis, the trans-ventricular route is preferred. For noncalcified disease, open, direct-vision aortic valvotomy with hypothermia is recommended. Mortality need be no higher than 10 to 15 per cent.

RUSSELL BROCK, M.S. Guy's Hospital, London. *Brit. M. J.* 5026:1019-1028, 1957.

Experiences with the "Second-Look" Procedure in the Management of Cancer of the Colon and Rectum

With Special Reference to Site of Residual Cancer

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IN SPITE OF SOME GAINS through earlier diagnosis and the use of improved primary operations for rectal and colic cancers, there still remains a large group of patients who are not cured by these initial procedures. This group includes essentially those patients whose lymph nodes were cancerous at the initial operation.¹⁻³

For example, a 27 per cent five-year survival rate was achieved in lymph node positive cases of cancer of the colon treated by curative resection at the University of Minnesota Hospitals in 1948 in contrast to a 71 per cent five-year survival rate in the lymph node negative group. Moreover, as primary operations are still largely carried out upon symptomatic patients, it is general experience that from 65 to 70 per cent of visceral cancers have metastasized to lymph nodes by the time initial surgery is undertaken.

The systematic use of secondary operations following the original excision of a visceral cancer was initiated by Wangensteen² in 1949 and has since been employed in an effort to cure a higher proportion of patients who have metastatic cancer within lymph nodes at the time of the primary operation.

Some of our experiences with this plan have been gratifying and would suggest that this concept of reoperation in the absence of symptoms

and clinically detectable recurrence offers new hope in the treatment of some advanced malignancies.²⁻¹¹ Additionally, it has provided a unique opportunity to study the biology of the spread of residual visceral cancer and has permitted objective observations of the limitations of conventional primary operations.^{4, 5, 12, 13}

PLAN OF TREATMENT (Table 1)

In the main, second-look operations have been done on patients who had gastric, colic, or rectal cancers with lymph node metastases, although the method has also been applied to a group of miscellaneous malignancies, including cases of retroperitoneal sarcomas. *Approximately six months* after the original excision and while the patients are asymptomatic and *without* clinical evidence of residual cancer, they are reoperated upon. A thorough search for any suggestion of residual is made; any suspicious nodule is removed, together with any remaining lymph node bearing tissue near the primary site of operation. Residual cancer, if found, is removed, unless the situation is obviously out of hand. If cancer is found at this second-look operation, subsequent

TABLE 1
SECOND LOOK
PLAN OF TREATMENT

Cancers of stomach, rectum, or colon with involved nodes

1st. operation

Interval of 4 to 9 mo. with no evidence of cancer.

2nd. operation (2nd look)

If cancer found, continue.

3rd. operation (3rd look)

Etc., until no more cancer is found.

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exploratory operations called *third*, *fourth*, and so on, looks are carried out at similar intervals of time until no cancer is found. Once a patient has undergone a *negative* exploration (with negative histologic study of tissues removed), no more surgery is recommended unless clinical evidence of a recurrence becomes apparent.

Initially in the study, second-look operations were done for some patients with quite well-localized cancers *without* extension to the lymph nodes. As the study progressed, it was found that an extensive primary operation usually had been adequate for this group. However, some lymph node negative patients with extension beyond the host organ to adjacent organs and tissues ("limited intraperitoneal carcinosis") and some patients with symptomatic advanced carcinosis continue to be candidates for the method.^{4,9} *Patients whose cancer has metastasized to the regional lymph nodes*, making up approximately *two-thirds* of any group of patients with resectable visceral cancers, offer the greatest *challenge* to the *second-look method*.

At the time of re-exploration, systematic examination of the entire abdominal cavity and the contained viscera is performed. This has included an examination of both the intraperitoneal and extraperitoneal areas insofar as is possible. A detailed identification and tabulation as to location of the residuals by the surgeon and the pathologist have been made; the specimens for histologic study have been meticulously examined, using multiple and, in some cases, serial sections. It has been common to study as many as 30 specimens for a single case.

Because false negatives can occur either by failure of the surgeon to recognize residual cancer or through failure of the pathologist to find small areas of cancer in tissues removed, every effort has been made to reoperate thoroughly, *removing, if possible, all suspicious tissues*.

ILLUSTRATIVE CASES

We have chosen 3 successful cases to illustrate the method as follows:

Case 1. Mrs. I. C., a 52-year-old woman, had a primary left colectomy with resection of a segment of ileum in March 1949. The primary neoplasm was an adenocarcinoma of the sigmoid colon with several mesenteric lymph nodes involved and spread by direct invasion to the lower ileum.

A second-look operation was performed in September 1949 while she was asymptomatic and clinically free of detectable cancer. At reoperation, residual cancer involving the uterus, left uterine tube, and lower ileum was found. A panhysterectomy and en-bloc resection of the involved portion of the small bowel and primary entero-enterostomy was done. Recovery was uneventful.

In May 1950, a third operation was carried out while

the patient was free of symptoms. No evidence of residual cancer was found. She is living and well, free of clinically detectable cancer six years and ten months since her negative look operation.

Case 2. J. L., a 30-year-old woman, had a primary abdominoperineal resection with subtotal left colectomy and iliac, hypogastric, and a preaortic dissection in January 1954. Her primary lesion was an adenocarcinoma of the rectum with multiple mesenteric lymph node metastases. She was asymptomatic and free of detectable residual cancer at the time of her second-look operation in July 1954. At this exploration, residual cancer in obturator and paravesical lymph nodes located deep in the pelvis to the left of the bladder was found and excised along with additional lymphatic bearing tissues around the bladder and ureteral vesical areas. Panhysterectomy was also performed.

In December 1954, her third look was carried out. A thorough search of the abdominal cavity failed to reveal residual cancer. She is living and well, free of clinically detectable cancer two years and three months since the negative look operation.

Case 3. Mrs. C. McK., a 60-year-old woman, had a carcinoma of the cecum with metastases to regional lymph nodes removed in November 1948. Five months later, while asymptomatic, she was readmitted for a second-look operation. An enlarged lymph node, located at the root of the small bowel mesentery just over the aorta, was removed. Microscopic examination of the node showed that it contained metastatic cancer.

The patient had no signs or symptoms of residual tumor when she returned for a third-look operation in July 1949. Recurrent cancer was found in a nodule removed from the periaortic region just cephalad to the previously excised residual.

At the fourth-look operation in January 1950, two nodules removed from the left periaortic area were found to contain metastatic adenocarcinoma. No other evidence of recurrence was found.

At the fifth-look operation, nine months after the fourth, an extensive excision of the retroperitoneal tissues adjacent to the upper abdominal aorta and vena cava was done. Microscopic examination of this tissue revealed carcinoma in a node located behind the second portion of the duodenum and over the aorta.

The sixth look, which was done five months later in February 1951, was a careful general exploration of the abdomen with excision of a large amount of lymphatic-bearing tissues from the upper abdomen, the only area in which lymph node excisions had not been previously done. No evidence of residual cancer was found. She is free of disease six years and one month since her final negative operation. This courageous patient is gainfully employed and living a healthy, active life.

The operative procedures for these illustrative cases were performed by Drs. Owen H. Wangenstein, F. John Lewis, Lyle Tongen, David State, and Stuart W. Arhelger.

RESULTS

This report includes 96 patients who had lymph node positive cancer of the *rectum or colon* who have had 135 "look" operations. Of the total group, 49 patients (51 per cent) were found to harbor residual cancer at their second operation. Forty-seven (49 per cent) were negative.

In all, 8 patients who had residual cancer found at their first "second-look" operation have come to a final negative look. They continue to show no evidence of disease for a range of thirty-two to one hundred and one months after their primary operation, a salvage rate of 16.3 per cent of patients with hitherto hopeless residual cancer of the colon or rectum. Four of these patients are now living and well over five years since their final negative look operation.

Operative mortality. We are happy to report that there have been no operative deaths among the patients who had negative explorations. The patient operative mortality has been 6.2 or 4.4 per cent based on the total number of look operations performed. The operative mortality has been related to very aggressive attempts to extirpate completely extensive residuals involving multiple tissues and organs. Three of the operative deaths occurred after extensive liver resections (2 total right hepatic lobectomies and 1 total left with subtotal right).

The patient operative mortality exclusive of extensive hepatectomy was 3.1 or 2.2 per cent for the total number of operations performed.

Cancer of the rectum. Tables 2 and 3 contain the results for cancer of the rectum. In table 2, it can be seen that there have been 3 patients who have been successfully treated and have come to a final negative look. In 2 of these 3 patients, residual cancer was found in lymph nodes at a second-look procedure carried out about six months after a combined abdomino-

TABLE 3
CANCER OF RECTUM. REOPERATION ON 45 PATIENTS
WITH POSITIVE LYMPH NODES (62 OPERATIONS)
NO CANCER FOUND AT SECOND LOOK,
23 PATIENTS, 28 OPERATIONS

Status	No. of patients	Length of follow-up after 1st operation (mo's.)
Living and well	15	Range: 17-78 Average: 47
Living with residual	1	72*
Dead of cancer	5	59, 31°, 23, 20, 13
Dead (other than cancer)	2	55, 52
Operative deaths	0	

*This patient had an excision of a metastatic lung nodule in conjunction with a negative second look exploration; 34 months have elapsed since last operation; additional lung nodules have developed during the past months.

°°Although the second look was negative, a positive operation followed.

Status as of April 1, 1956.

perineal operation for cancer located in the rectum (within 14 cm. proximal to the dentate line). Resection of the residual cancer was accomplished at the second-look procedures, and no cancer was detected at third-look operations carried out at a later date. In table 3, it is noted that despite a negative first second-look, 5 patients subsequently died of their disease.

Sites of residuals: rectal cancer. In addition to the possible salvage of patients with residual cancer, the second-look operations have offered a unique opportunity to study the location of early asymptomatic residual cancer following abdominal perineal resection.

Tables 4, 5, and 6 show the sites of residuals found at 26 look operations for 18 asymptomatic patients with residual rectal cancer.

Table 4 shows that 8 of the 18 patients harbored what we have classified as infiltrative, implantation, or transplantation type of residuals.

It stresses the high incidence of local residuals of this type deep in the pelvis or perineum.

Table 5 contains data regarding residual cancer in lymph nodes and additionally shows the cases with liver metastases and 1 instance of new or occult carcinoma of the colon. It should be emphasized that 10 of 18 patients had residual cancer in lymph node groups. These residuals occurred in node groups that in more recent years have come to be more routinely removed for curative operations for rectal cancer. It serves to stress the importance of the iliac, hypogastric, preaortic, and obturator and paravesical lymph nodes as sites of lymphatic metastases. It is interesting to note that there were no cases classified as carcinomatosis found in the rectal group.

TABLE 2
CANCER OF RECTUM. REOPERATION ON 45 PATIENTS
WITH POSITIVE LYMPH NODES (62 OPERATIONS)
CANCER FOUND AT SECOND LOOK,
22 PATIENTS, 34 OPERATIONS

Status	No. of patients	Length of follow-up after 1st operation (mo's.)
Living and well: last look negative	3	49, 26, 20 (31, 15, and 8 mo's. since the negative look)
Living and well: awaiting another look	2	11, 8
Living with residual	2	11, 8
Dead of cancer	14	Range: 5-53° Average: 20.7
Dead (other than cancer)	0	
Operative deaths	1	

*One patient was positive at a second look, negative at a third look, and subsequently expired.
Status as of April 1, 1956.

TABLE 4
SITES OF RESIDUALS: RECTAL CANCER
18 PATIENTS, 26 LOOK OPERATIONS

	No. of patients	No. of positive operations
I. Probable infiltrative, implantation, or transplantation residuals:		
1. Area of primary tumor and operative bed		
Pelvic and perineal walls	6	6
Vena cava	1	1
Abdominal wound	1	1
2. Adjacent organs		
Ureter	2	2
Bladder	1	1
3. Areas away from operative bed		
Small bowel (including duodenum)	3	3
Omentum	1	1
Found in a total of 8 of 18 patients		

In table 6, it is noted that 5 of 18 patients had residuals localized to lymph nodes; these were controlled in 2 patients. However, of 6 patients with localized infiltrative or implantation type of residuals, only 1 was converted to negative.

Early in the study, before iliac, hypogastric, and preaortic lymphatic dissections were regularly done at the primary operation, several patients had second-look procedures that revealed involvement of iliac, hypogastric, and

TABLE 5
SITES OF RESIDUALS: RECTAL CANCER
18 PATIENTS, 26 LOOK OPERATIONS

	No. of patients	No. of positive operations
II. Residuals in lymph nodes		
Iliac	7	7
Hypogastric	5	5
Pre- or lateral aortic and/or vena caval nodes	4	4
Obturator nodes	3	3
Paravesical nodes	1	1
Found in a total of 10 of 18 patients		
III. Venous tumor embolism		
Liver (3 of 5 bilateral metastases)	5	5
IV. New or occult primary carcinoma of colon	1	1
V. Carcinomatosis	0	0

TABLE 6
SITES OF RESIDUALS: RECTAL CANCER
18 PATIENTS, 26 LOOK OPERATIONS

	No. of patients	Controlled
Lymph node residuals	5	2
Infiltrative, implantation or transplantation residuals (only)	6*	1
Venous tumor embolism (liver metastases only)	3	0
Infiltrative plus lymph node residuals	2	0
Infiltrative plus lymph node, liver residuals	2	0
Total	18	3

*3 of 5 had pelvic or perineal wall residual.

aortic lymph nodes. Residual cancer located here was successfully removed in some patients who subsequently succumbed to deep pelvic recurrences or liver metastases.

Residual cancer located deep in the pelvis, especially beyond the pelvic fascia in the perineural tissues of the sciatic plexus, has proved to be common and difficult to control. Thus far, this type of residual or liver metastases appears to be the limiting factor in our ability to achieve frequent success in this group of patients.

Cancer of the colon. As previously reported, the most encouraging group has been the patients with cancer of the colon.

Table 7 contains data for the patients with positive second-look operations. It can be seen that there are 5 patients among 27, or about 20 per cent, found with residual cancer at a "second-look" operation who finally had a negative look and who have remained free of detectable neoplasm. In addition, there is 1 patient who is living and well and awaiting another "look."

Four of these patients have now passed the five-year period since their final negative operation.

Table 8 indicates the fate of the 24 patients who originally had metastatic colic cancer but who were free of cancer at the first second-look. It has been gratifying to find that all but 2 of these have remained free of detectable cancer. Two patients found negative at the first second-look exploration have since died of cancer.

Sites of residuals: colon cancer. A study of the location and nature of residual colic cancer has also been made (tables 9, 10, and 11).

Infiltrative or implantation residuals were found in 50 per cent of the 18 patients itemized (table 9). This particular table emphasizes the

TABLE 7
CANCER OF COLON. REOPERATION ON 51 PATIENTS
WITH POSITIVE LYMPH NODES (73 OPERATIONS)
CANCER FOUND AT SECOND LOOK,
27 PATIENTS, 49 OPERATIONS

Status	No. of patients	Length of follow-up after 1st operation (mo's.)
Living and well:		
last look negative	5	89, 87, 84, 54, 31° (71, 68, 61, 32, 11 mo's. since negative looks)
Living and well: awaiting another look	1	12
Living with residual	0	
Dead of cancer	16**	Range: 9-37 Average: 20.4
Dead (other than cancer)	0	
Operative deaths	5	23, 13, 12, 6, 5

*"Second look" negative; later residual noted and resected at third operations; fourth look negative.

**One patient had positive second look and negative third; subsequent residual noted and resected at fourth operation; subsequently expired.

Status as of April 1, 1956.

importance of recurrence in the area of the operative bed and adjacent organs. It is noted that the abdominal wound was implanted in 2 cases. There were 2 instances of implantation type of anastomatic recurrences of the type emphasized by Cole and his associates.¹⁴ The uterus, ovary, and bladder were involved in patients whose primary lesions were sigmoid in location. The one instance of residual in the pancreas occurred in a patient whose previous primary carcinoma was located in the splenic flexure.

Table 10 emphasizes the fact that residual cancer within lymph nodes of the superior mesenteric artery group at the origin of the vessel in

TABLE 8
CANCER OF COLON. REOPERATION ON 51 PATIENTS
WITH POSITIVE LYMPH NODES (73 OPERATIONS)
NO CANCER FOUND AT SECOND LOOK,
24 PATIENTS, 24 OPERATIONS

Status	No. of patients	Length of follow-up after 1st operation (mo's.)
Living and well	20	Range: 1-123 Average: 50.4
Living with residual	0	
Dead of cancer	2	41, 28
Dead (other than cancer)	2	41, 40
Operative deaths	0	

Status as of April 1, 1956.

a retropancreatic position constitutes an important barrier to the more frequent cures of cancer of the colon. As this table illustrates, these nodes can be involved in many lesions occurring at diverse locations within the bowel.

It is interesting to note in table 11 that 5 of these 18 patients eventually came to a negative operation, which probably signifies control of their disease. Both of the patients with only the lymphatic type of residuals and 3 of 5 patients with localized infiltrative or implantation residuals were controlled. Thus far, no patients with liver metastases of the venous embolism type have come to a final negative look.

SUMMARY

In spite of efforts directed toward early diagnosis and the use of improved and more radical primary operations, a large number of patients with metastases to regional lymph nodes are not cured by their initial procedure. In fact, 51 per cent of asymptomatic, clinically negative patients with previous lymph node positive cancers of the rectum or colon were found to harbor residual cancer at a second-look operation. The use of secondary or multiple operations is an attempt to achieve some success among these more ad-

TABLE 9
SITES OF RESIDUALS: COLIC CANCER
18 PATIENTS, 35 LOOK OPERATIONS

	No. of patients	No. of positive operations
I. Probable infiltration, implantation, or transplantation residuals		
1. Area of primary tumor and operative bed		
Aorta	2	3
Abdominal wound	2	3
Omentum (adjacent to stomach)	2	2
Anastomotic recurrence	2	2
Iliac fossa and vessels	1	1
Vena cava	1	1
2. Adjacent organs		
Uterus	2	2
Ovary *	2	2
Pancreas	1	1
Bladder	1	1
3. Areas away from operative bed		
Small bowel (including duodenum)	5	5
Colic surface	2	2
Perirenal fat	2	2
Small bowel mesentery	1	1
Liver surface	1	1
Adrenal	1	1
Found in a total of 9 of 18 patients		

TABLE 10
SITES OF RESIDUALS: COLIC CANCER
18 PATIENTS, 35 LOOK OPERATIONS

	No. of patients	No. of positive operations
II. Residuals in lymph nodes		
Superior mesenteric groups ^a		
Central superior mesenteric nodes	3	3
Retropancreatic	2	2
Small bowel mesentery	1	1
Pre- or lateral aortic nodes, and vena caval nodes	2	4
Iliac and/or hypogastric	1	1
Renal pedicle	1	1
Found in a total of 4 of 18 patients		
III. Venous tumor embolism		
Liver (without associated carcinomatosis)	5	7
IV. Generalized carcinomatosis	4	

^aLocation of primary lesions:
1 descending colon, 1 splenic flexure, 1 cecum.

vanced cases and has been essentially a clinical experiment.

We feel that the period of study and observation is insufficient to determine statistically the accomplishment regarding prolongation of life and cure rates. However, it seems clear that through these methods the prognosis of some patients suffering from hithertofores undetected, fatal, residual cancer can be favorably altered. Success has occurred most often in the management of colic cancer. Occasional success has been achieved in patients with residual cancer of the stomach^{4,5,9} or rectum, and it has been heartening to gain final negative looks even in some

TABLE 11
SITES OF RESIDUALS: COLIC CANCER
18 PATIENTS, 35 LOOK OPERATIONS

	No. of patients	Controlled
Lymph node residuals (no other tumor found)	2	2
Infiltrative, implantation or transplantation residuals (alone)	5	3
Venous tumor embolism (residual liver metastases alone)	3	0
Infiltrative plus lymph node residuals	2	0
Infiltrative residuals plus liver metastases	2	0
Carcinomatosis	4	0
Total	18	5

with retroperitoneal sarcomas and advanced symptomatic intra-abdominal cancers.^{4,5,9}

An interesting facet of the second-look study has been the review of the pathologic information relating especially to the location of early residual cancers.^{4,5,12,13} This has offered an unusual opportunity to make objective observations of the limitations of various primary procedures. In gastric cancer, this has led to changes in the plan of current initial operations to include routine dissection of the hepatic pedicle and retropancreaticoduodenal areas.¹³ In colic and rectal cancer, it has strengthened our convictions for the regular dissection of the iliac, hypogastric, pre-aortic, and vena cava nodes and has augmented our awareness of the great problem of local recurrence, implantation metastasis, and venous tumor embolism.

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Surgical Treatment of Abdominal Aortic Aneurysm

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MANY INGENIOUS METHODS have been devised in the last century for the treatment of aortic aneurysms, but, with the exception of excision and grafting, none has materially altered the progress of the disease process.

The earlier basic methods of treatment consisted of ligation, promotion of thrombosis within the aneurysm by wiring, and external support to the aneurysm by direct application of supporting material or by stimulating fibroplasia. Aggressive surgical treatment of aortic aneurysms is justified, since the life expectancy averages about one year after a diagnosis of abdominal aortic aneurysm is made.¹ Perforation with hemorrhage is the usual cause of death.

The present day method of treatment may be looked upon as an end product of a series of advances in surgery of the blood vessels which have taken place over a period of many years. Primarily, these are perfection in methods of suture, grafting of blood vessels, and preservation of blood vessels for grafts. Equally important among other things has been progress of our knowledge in physiology, anesthesiology, pre- and postoperative care, antibiotics, and the development of newer surgical instruments.

Many consider the turning point in aortic surgery to be the successful resection of coarctation of the aorta and primary repair by Crafoord² and by Gross³ in 1945. Gross then utilized homografts in certain cases of coarctation of the aorta.⁴ Finally, on March 29, 1951, Dubost⁵ and his colleagues of Paris successfully resected an arteriosclerotic abdominal aortic aneurysm and bridged the defect with a homologous aortic graft.

In America, DeBakey and Cooley were the most aggressive to attack aneurysms by excision and homograft. DeBakey reported his first case in December 1952,⁶ and a year later, DeBakey⁷ reported on 50 consecutive cases of resection of the aorta and homografting. Of this group, 26

were for aneurysms. The over-all mortality was 18 per cent. The surgical procedure had at last become well established, and reports of successful surgical excisions began to accumulate in the literature.

PRESENT STUDY

This report covers our experience with resection and homografting of 16 male patients with abdominal aortic aneurysms. The first patient of this series was operated upon in March 1954. Although woven nylon vessel substitutes are available to us, we prefer to use lyophilized or freshly preserved homografts.

The age range at the time of surgery was from 55 to 67 years, with an average age of 62 years. One patient, age 58, had an aneurysm diagnosed eight years previously, at which time surgery was performed and the aneurysm wrapped with cellophane. A second patient gave a history of having had the aneurysm diagnosed two years previously. All other patients had the aneurysm diagnosed shortly before or after admission to the hospital.

Preoperative examination. Three patients were asymptomatic. In 2 patients, the aneurysm was diagnosed during a routine physical examination, and, in 1 patient, the aneurysm was found during laparotomy for biliary tract disease. This patient had the aneurysm removed six months later.

In the remaining 13 patients, abdominal pain was the chief complaint. On physical examination, a pulsating abdominal mass was noted in 15 patients. In the patient whose aneurysm was found at laparotomy, subsequent examination revealed the presence of a palpable pulsating abdominal mass which should have been detected earlier.

Rupture of the aneurysm and massive bleeding were diagnosed in 2 patients, and surgery was undertaken with the patient in severe shock. Rapid blood replacement could not correct the hypotension preoperatively.

Preoperative aortograms were taken in only 2 patients. Calcification in the aneurysmal wall of

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the aorta was detected by roentgenography in 9 of the 16 patients. Ten patients had abnormal preoperative electrocardiograms; 4 gave a history of previous myocardial infarction; 1 was a diabetic; and 10 had a systolic blood pressure of over 160 or a diastolic blood pressure of 100 or more.

Preoperative preparation and postoperative care. In preoperative preparation, particular emphasis is placed on having the intestinal tract completely decompressed and empty of bowel contents, since exposure may be difficult, especially when the aneurysm is high. This is best accomplished by placing the patient on a low residue diet for two to three days, administering castor oil catharsis and enemas, and beginning naso-gastric suction the night before surgery. Intestinal antibiotics, such as neomycin, are given for thirty-six to forty-eight hours preoperatively. This step is recommended, since the blood supply to the descending and sigmoid colon may be impaired with inferior mesenteric artery ligation, and, conceivably, some patients may need a bowel resection. There are other considerations, such as temporary impairment of the blood supply and bacterial invasion through the gut wall.

All patients have a thorough preoperative evaluation of cardiac and renal status, liver function, and of the peripheral circulation.

Postoperative care is the same as for any abdominal surgical procedure.

Surgical technic. Under general anesthesia, a long midline or left paramedian incision is made and the abdomen is explored. The colon is reflected to the left and the small intestine to the right, and an incision is made in the posterior peritoneum over the aneurysm and over the iliac vessels. Early in the procedure, the upper limits of the aneurysm are determined. As a rule, sufficiently uninvolved aorta remains below the renal arteries to permit anastomosis at this level. Tapes are passed around the aorta at this level and distally around the uninvolved portion of the iliac vessels. The inferior mesenteric artery is, of necessity, routinely taken. Usually, the artery is occluded at the take-off from the aorta. During the surgical procedure, the color of the colon is checked at intervals. In our experience, we have never seen evidence of inadequate blood supply to the colon at the time of surgery, but one of our deaths on the seventeenth postoperative day was caused by gangrene of the colon.

Dissection of the aneurysm from the surrounding structure is most difficult on the right side where the vena cava is intimately attached to the aneurysm and in the area where the common

iliac vessels are attached to the aneurysm when the iliac vessels are involved.

When the aneurysm is small, the entire aneurysm may be mobilized prior to cross-clamping of the aorta, but when the aneurysm is very large, the posterior dissection must be done after cross-clamping of the aorta and the iliac vessels distally. Transection of the distal aspect permits elevation of the aneurysm to continue the dissection in the prevertebral area. When the aneurysm is completely mobilized prior to cross-clamping, particular emphasis is placed on minimal manipulation of the aneurysm lest an embolus develops to the lower extremities. At the time of cross-clamping of the iliac vessels, heparin solution containing 5-10 mg. is injected into the distal vessels. In cross-clamping the aorta, we have used a variety of clamps, such as the large Blalock clamp, Beck, or Glover aortic clamp.

A previously prepared homograft with all the branches ligated with silk sutures is then rapidly sutured into place to bridge the defect. Anastomosis may be performed with a continuous over-and-over stitch abutting the vessel ends or with a mattress eversion type of suture with 5-0 arterial silk. As a rule, after one iliac vessel has been anastomosed and the upper anastomosis completed, blood is permitted to flow to one side while the second iliac artery is being anastomosed. When the bifurcation is uninvolved, the procedure is considerably simplified, since only two anastomotic lines are necessary. Cross-clamping of the aorta has taken as long as two hours, but the majority of the patients have had the aorta clamped for less than one hour, the shortest duration being twenty-eight minutes.

Bleeding from the anastomotic line at the time of surgery has never been a problem. Bilateral lumbar sympathectomy is routinely performed on all patients. The graft site is completely peritonealized before the abdomen is closed.

RESULTS

All the aneurysms were arteriosclerotic in origin. Four deaths occurred postoperatively. The 2 patients operated upon for rupture of the aneurysm failed to survive. One of these patients died four hours postoperatively of a cardiac arrest, and the other patient died three days postoperatively in shock and in renal failure. One patient had a thoracoabdominal aneurysm involving the renal artery, superior mesenteric, and the celiac artery. Although the aneurysm was successfully excised and all the main branches anastomosed, death occurred four hours postoperatively. Autopsy showed a massive pulmonary embolus. One patient with an aneurysm



Fig. 1. Photograph at operation of a huge aneurysm involving both common iliac and hypogastric arteries. Acute arterial insufficiency to left leg developed postoperatively, and subsequent amputation of lower leg was necessary. Patient is well two years after surgery and is working full time.

involving the aorta and extensive involvement of the right common femoral artery died seventeen days postoperatively of gangrene of the sigmoid colon and peritonitis.

There were two late deaths. One patient died nine months postoperatively of myocardial infarction, and the other died eighteen months postoperatively of pneumonia and cardiac decompensation. Autopsies in both of these patients showed the grafts to be free of thrombi and no aneurysmal formation.

Ten patients are alive and well; 6 of them have survived two to two and one-half years.

In this series, acute vascular insufficiency to an already impaired circulation to the legs developed in 3 patients. Despite exploration of the femoral and popliteal areas, above-the-knee amputation of one extremity was necessary in each of the 3 patients. Two of these patients are among the 10 survivors and have been fitted with limbs. One patient among the survivors required reoperation on the seventh postoperative day because of massive hemorrhage from the graft. The patient was hypertensive, blood pressure 190/130, and, at the time of the initial surgery, a fresh graft from a 24-year-old



Fig. 2. Photograph at operation depicting a typical arteriosclerotic aneurysm with minimal involvement of the bifurcation. Note numerous irregularities in thinned out aorta. Patient is well and free of symptoms two years after surgery.

Fig. 3. Photograph at surgery of an example of a homograft in place. Proximal anastomosis was made just at the renal artery take-off. Patient is well one year and three months postoperatively.



girl was inserted. At the time of surgery, some fear was expressed that the graft appeared too delicate; nevertheless, the grafting was carried out. At reoperation, the hemorrhage was found to have occurred at the distal anastomotic line where the suture had cut its way through at a point on the graft side. A graft from an older man was inserted at the reoperation.

The illustrations, figures 1 through 4, show the appearance of the aneurysm at surgery, a graft in place, and the usual appearance of the aneurysm after the vessel is opened. The patient whose aneurysm is shown in figure 1 had both

hypogastric arteries severely involved; hence, anastomosis was made to the external iliaes only. Vascular insufficiency to the colon did not develop.

DISCUSSION

Patients who have aortic aneurysms are at best poor-risk patients. Many have hypertension and degenerative heart disease, but, since the prognosis of an aneurysm is poor and only surgery can offer a cure, operation is recommended for all patients who are able to tolerate surgery. In evaluating the treatment of aneurysms, most



Fig. 4. This photograph of a resected aneurysm shows why an aortogram may not depict size of the aneurysm. Lumen is essentially of normal size, and aneurysm is filled with a laminar clot.

surgeons consider a patient with a ruptured aneurysm and in severe shock as having a slim chance for survival. The patient with a thoraco-abdominal aneurysm requiring anastomosis of the various visceral arteries probably should also be considered in a separate category. This would leave only one immediate mortality in our series in the usual variety of arteriosclerotic abdominal aortic aneurysms involving the aorta below the renal arteries.

The death of 1 patient eleven days postoperatively of gangrene of the colon with peritonitis could have been prevented had the difficulty been detected early. Thrombosis of a critical anastomotic branch may have accounted for the gangrene. The 2 late deaths at nine months and at eighteen months appear to be the inevitable results of patients with generalized arteriosclerotic disease process and unrelated to the operative procedure itself.

The occurrence of postoperative arterial insufficiency to the legs in 3 of the 15 patients is very disturbing. Other surgeons have also reported this complication.^{8,9} This complication did not develop in any of the last 9 patients in this series, and this is probably related to the greater care taken in manipulating the aneurysm

during the dissection and earlier cross-clamping of the iliac arteries and aorta when the posterior dissection became difficult. When an arterial insufficiency does occur, the cause appears to be embolization from the aneurysm itself.

SUMMARY

1. Experience with 16 arteriosclerotic abdominal aneurysms treated by excision and aortic homografting is presented.

2. The indications for surgery are quite liberal, since only surgery can offer a potential cure.

3. Pain and a pulsating abdominal mass are the predominant symptoms and physical findings.

4. Three patients were completely asymptomatic at the time the aneurysm was found.

5. Rupture of an aneurysm with the patient in shock carries a poor prognosis despite emergency surgery. Hence, once an aneurysm is diagnosed, surgery should be undertaken regardless of the size or duration of the disease or age of the patient, except in the face of obvious contraindication to any surgical procedure.

Four additional patients have been operated upon since this report was submitted for publication.

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Early Results of By-Pass Vascular Shunts and Grafts Using Nylon Prostheses

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MANY FORMS OF SERIOUS VASCULAR DISEASE which heretofore were treated in a palliative fashion or were ignored can now be remedied by specific surgical procedures. Reconstitution of vascular flow often requires the use of grafts (either homografts, autogenous venous grafts, or some other prosthetic material), and the method used to insert these grafts depends on the problem at hand. For occlusive disease of the aorta or for aneurysms of the aorta, resection with primary anastomosis or interposition of a suitable graft is the method of choice. However, for occlusive vascular disease involving the iliac, femoral, or axillary arterics, the method of by-passing the involved area with a suitable shunt is proving successful.

During recent years, vascular reconstitution has been performed at the University of Minnesota Hospitals and the Minneapolis General Hospital using preserved arterial homografts (beta-propiolactone and Hank's solution), autogenous venous grafts, polyvinyl sponge (Ivalon) prosthetics, and, more recently, the nylon tubes introduced by W. S. Edwards and J. S. Tapp. From June 1, 1956, to August 15, 1957, 57 operations using nylon grafts or shunts have been performed in 54 patients. The operations have been performed by the resident staff as well as the teaching staff of both hospitals. The pathologic conditions necessitating surgery included aneurysms of the aorta (dissecting, ruptured, or elective), aneurysms of peripheral vessels, segmental thromboses of the aorta and more distal blood vessels, segmental thromboses of the femoral artery in the region of Hunter's canal, and the

more diffuse arterial occlusive involvement frequently seen in older diabetic patients. Roentgenographic confirmation of clinical diagnoses was provided with aortograms and peripheral angiograms whenever possible.

RESULTS WITH TAPP-EDWARDS NYLON TUBES

We have used the standardized technic of treating the end of the Tapp-Edwards tube with cautery prior to suturing and have used 4-0 and 5-0 vascular silk with a whip stitch for either the end-to-end or the end-to-side anastomosis. Early in our use of the nylon tubes, we were plagued with copious bleeding from the interstices of the material immediately upon reconstituting flow in the graft. Preclotting of the nylon tube with the patient's own unheparinized blood was not successful in our hands until recently when we began using a fine Penrose drain as a stent pulled through the nylon tube. This stent prevents collapse of the walls of the tube and subsequent agglutination of the surfaces, while the Tapp-Edwards tube lies in its tunnel of surrounding tissue during performance of the anastomosis. This Penrose drain is removed just prior to reconstitution of flow through a small incision in the side of the graft, previously congealed with the cautery, and the incision is closed with a whip stitch after flow has been well established. This latter method has worked well, and our blood loss from the porous material has been greatly reduced.

The experience at the University Hospitals and the Minneapolis General Hospital is presented in table 1. The 31 patients with femoral popliteal shunts had proved segmental obstructions of the femoral artery, and, in 16 of these, the nylon shunts were successful, remaining patent up to twelve months after surgery. The 12 failures were in patients who, for the most part, had rather diffuse involvement of the peripheral circulation in the involved limb and had significantly reduced blood flow ("run-off") distal to

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TABLE 1
VASCULAR RECONSTITUTION WITH TAPP-EDWARDS
NYLON TUBES
June 1, 1956, to August 15, 1957

Arteries	Number	Successes	Failures	Expired
Shunts				
Femoral-popliteal	31	16	12	3
Aorta-iliac	1	1		
Iliac-femoral	3	3		
Aorta-femoral	11	10	1	
Aortic bifurcation reconstruction to:				
Iliac arteries	5	4		1
Femoral arteries	4	2		2
Aortic grafts	2	2		
	57	38	13	6

Fifty-seven grafts or shunts on 54 patients; 2 patients had bilateral femoral-popliteal shunts.

the popliteal anastomosis. Many of these latter patients were diabetics, and the operations were performed as a final effort to postpone amputation of the limb. Shunting procedures are particularly useful in patients with "borderline problems," since the surgery does not disturb collateral blood vessels and further impair the extremity in cases of failure. The 3 deaths in this category were due to coronary occlusions in 2 instances and a disseminated thrombosis in the third patient (subsequent to embolization from an occult lower aortic aneurysm induced during manipulation of the aneurysm while a lumbar sympathectomy was performed). The deaths were not directly attributable to technical features of the shunt procedure in either instance.

COMPARISON OF TAPP-EDWARDS NYLON TUBES WITH OTHER MATERIALS

Two materials have proved beneficial for performing femoral-popliteal shunts in our hospitals: the "5/16"-in. straight nylon tube and autogenous vein grafts. From table 2, it is appar-

TABLE 2
COMPARISON OF FEMORAL-POPLITEAL SHUNTS

	Number	Successes	Failures	Expired
1. Nylon	31	16	12	3
2. Autogenous vein	30	25	5	—
3. Ivalon	2	—	2	—

ent that the experience in our hospitals with autogenous vein grafts is slightly better than with nylon tubes to date. However, several patients had to be operated upon a second time several years after an autogenous vein had been used as a femoral-popliteal shunt and have these thrombosed grafts replaced with nylon shunts. In each instance, the nylon tubes have proved successful over a prolonged period of time. It is our impression that venous grafts continue to fibrose and scar down, predisposing the venous shunt graft to increased thromboses as time goes on.

In those instances in which nylon shunts have failed, the thrombosis of the grafts has appeared early following surgery — usually within the first two months. From our experience, a patient is safe from thrombosis within a nylon femoral-popliteal shunt when he has passed the second or third postoperative month. About 65 per cent of our successful patients are now ten and twelve months postoperative with fine results using limbs which previously had been virtually useless because of severe claudication.

Ivalon has not proved successful in our hands for shunts in this area, and our first 2 cases were failures. We have ceased using this material below the inguinal ligaments.

In the region of the bifurcation of the aorta, the reconstitution of vascular continuity is equally successful with nylon, Ivalon, or arterial homografts. From table 3, we see that these materials have all worked well in our hospitals. The deaths in this category reflect the serious nature of the patient's disease, for most of these reconstructions were performed after resection of aneurysms, and many of these were ruptured, necessitating emergency resections.

Nylon has been a successful material in shunts from the aorta to the iliac arteries and from the aorta to the femoral arteries (table 4). The 11 successful cases in this group have done well for as long as twelve months, and 1 patient has done well for six months after removal of a venous graft that had thrombosed. The ease of manipulation of the crimped nylon in the pelvis and the failure of this material to kink when

TABLE 3
COMPARISON OF AORTIC BIFURCATION RECONSTITUTIONS

	Number	Successes	Failures	Expired
1. Nylon	9	6	—	3
2. Ivalon	9	7	1	1
3. Arterial homografts	14	9	—	5

TABLE 4

COMPARISON OF AORTA-ILIAC AND AORTA-FEMORAL SHUNTS

	<i>Number Successes</i>		<i>Failures</i>	<i>Expired</i>
1. Nylon	12	11	1	—
2. Autogenous vein	5	2	3	—
3. Arterial homograft	2	1	1	—
4. Ivalon	3	2	1	—

bent upon itself make the Tapp-Edwards nylon tubes particularly adaptable for shunts in this area. The comparison of shunts from the iliac to the femoral arteries (table 5) reveals that both nylon and autogenous vein grafts have worked well. Ivalon, again, has not proved successful in this area.

DISCUSSION

Long-term results with various methods of reconstituting the vascular tree for normal flow cannot be stated as yet for human cases. However, in the search for newer and better materials to use in this field, progress is being made. From our experience, the Tapp-Edwards nylon tubes have provided a safe and adequate substitute for a blood vessel in the human patient for as long as twelve months. The necessity of removing venous grafts that have thrombosed after fifteen to twenty months and replacing these grafts with nylon makes us favor this latter material in many instances at the present time. For the interposition of straight grafts or bifurcations in the aorta, our experience with Ivalon has been satisfactory. Recently, we have been reinforcing Ivalon grafts with an interposed layer of nylon net and believe this strengthened polyvinyl graft will be an even more ideal vessel wall. The porous nylon of the Tapp-Edwards tube works well in the human aorta up to twelve months as our experience has proved. Similar grafts have been successful in dogs for two or more years.

As yet there is no ideal graft for vascular reconstitution. Where it is applicable, an autogenous vein has had the greatest measure of suc-

TABLE 5

COMPARISON OF ILIAC-FEMORAL SHUNTS

	<i>Number Successes</i>		<i>Failures</i>	<i>Expired</i>
1. Nylon	3	3	—	—
2. Autogenous vein	6	5	1	—
3. Arterial homograft	—	—	—	—
4. Ivalon	7	3	4	—

cess for the longest period of time. In those situations requiring grafts with greater substance, all materials reported in the literature have specific disadvantages. Preserved homografts have spontaneously ruptured, stenosed, or have become dilated; Ivalon without nylon reinforcement has dilated and become brittle; other synthetics, such as dacron and orlon, have lost their tensile integrity and become aneurysms on occasion; longer term results with woven nylon tubes in the human being may indicate similar disadvantages. Late thromboses and exaggerated degrees of fibrosis may contraindicate the use of nylon in the future; however, early reports are encouraging for its continued use at least in the immediate future. Additional broader experience probably will enable surgeons to select graft material from a rather wide range of materials as progress is made in this field.

SUMMARY

A series of 54 patients is presented who underwent 57 operations for vascular disease utilizing Tapp-Edwards nylon tubes as grafts. Our results with the nylon tubes have been satisfactory in the femoral-popliteal shunts, the iliac-femoral shunts, the aortic-femoral shunts, and in the reconstitution of the aorta bridging the bifurcation to the iliac or femoral arteries. The longest follow-up on our patients at this time is twelve months, but it is apparent that thrombosis of the nylon tubes usually occurs early in the post-operative period if at all. The Tapp-Edwards nylon tube appears to be a satisfactory substitute for blood vessels in human beings at this time.

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Experience with Surgery for Portal Hypertension

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THE PURPOSE OF THIS REPORT is not primarily to add another series of surgically treated cases of portal hypertension to the literature, but to analyze our experience particularly with respect to some questions which have not been emphasized in other papers. Assuming surgical competence, results and mortality in this field probably depend directly on selection of patients for operation; yet knowledge of indications and contraindications is far from established.

DATA OF PRESENT SERIES

There were 40 operations performed on 37 patients, 26 from a consecutive series at the Minneapolis Veterans Hospital and 11 from the University of Minnesota Hospitals, the latter group selected because of the author's presence at operation. The first operation was performed in November 1952 and the last in July 1957. The data from these cases are presented in tabular form and are seen to agree in many respects with those from other series.¹ The follow-up data are incomplete in recent cases, but experience shows that when a large shunt with an adequate fall of pressure has been obtained, recurrence of symptoms caused by portal hypertension is rare. Such cases have been counted tentatively as good results. Mortality includes all patients dying of any cause within one month after operation. Poor results include patients with inadequate shunts, by which pressure was not lowered below 30 cm. of water, who have been followed less than two years after operation, all patients with recurrence of complications related to portal hypertension, or deaths occurring after the postoperative period of one month. There have been 2 of these late deaths, 1 due to an inadequate shunt and the other to a thrombosed graft used in a portacaval shunt. An additional 2 deaths have occurred from recurrent alcoholism and hepatic coma twelve and sixteen months after surgery without recurrence of bleeding.

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The operations performed are listed in table 1 in order of choice. In other words, wherever possible an end-to-side portacaval shunt was preferred. The technics used are standard.

PRESSURE MEASUREMENTS

Table 1 summarizes the pressures measured at operation. The 0-point, with the patient supine, has been taken at the anterior surface of the vena cava opposite the porta hepatis. In splenorenal shunts, the 0-point was taken as the anteromedial surface of the vena cava, with the patient tilted far to the right side. In several patients, the inferior vena cava pressure was considerably elevated, apparently due to compression by the regenerating liver nodules. Venous pressure was normal in the upper extremities. High inferior vena cava pressure, of course, limits the effectiveness of a shunt. In some instances, failure to obtain an adequate fall of pressure after a shunt has called our attention to a kink in the portal vein, usually remediable by excision of a larger wedge of pancreas at the inferolateral portion of the vein. In other cases, we have redone the whole anastomosis and obtained a satisfactory pressure drop with better alignment of the vein. There has been recurrent bleeding in 1 patient in whom portal pressure was lowered below 30 cm. of water at operation and in 3 of 6 patients in whom it was not. This suggests that everything possible should be done to re-

TABLE 1

Operation	Total number	Mean portal pressure Before	Mean portal pressure After	Good result	Post-operative death
Portacaval	25	40	24	18	4
Splenorenal	8	41	28	4	3
Graft shunt	2	36	25	0	0
Esophago-gastrectomy	2	38	—	1	1
Ligation varices	1	—	—	0	1
Exploration	2	49	—	0	0

duce portal pressure below 30 cm. H₂O. This figure was given by Blakemore as the level below which further hemorrhage was unlikely to occur, and our data agree with it.

HEMORRHAGE

The question of how much bleeding from varices constitutes an indication for surgery cannot be answered scientifically at the present time, and opinion ranges from advocacy of shunts for nonbleeding varices to avoidance of surgery at any time. Our own cases were often taken as rather desperate emergencies, and we have not operated for nonbleeding varices as a sole indication.

The mainstays of emergency treatment for bleeding varices are the Sengstaken tube and adequate blood replacement. Measures to forestall ammonia intoxication also appear to be desirable.² Fortunately, the tube is nearly always effective, but trouble arises in a few cases where it is not or when the patient has gone into shock or incipient coma before treatment took hold. In the former case, a duodenal or gastric ulcer or gastritis may be present concomitantly with varices and require appropriate management. Five of our 23 patients with alcoholic cirrhosis and varices had roentgen evidence of duodenal or gastric ulcers as well as varices. The occurrence of shock or coma so obviously increases the surgical risk that operation must be deferred at least for several days. In patients in whom shock and coma have been avoided and the Sengstaken tube has been effective, we have carried out surgery successfully without waiting to see if bleeding would stop when the tube was removed.

The hospital population from which these cases were selected is of primary interest. At the Veterans Hospital, in 1952, when the first patient was operated upon, 52 cases of cirrhosis were seen, 51 of which were associated with alcoholism and 1 with hepatitis. No extrahepatic portal obstruction was diagnosed in that year. Although there were 11 patients with bleeding varices of the esophagus, only 1 was operated upon. This patient was a poor selection by our present criteria, because liver function showed severe impairment. He died in coma five days after the shunt. Perhaps because of this event, several other bleeders with better liver function were not referred for surgery. Follow-up of these patients discloses that 6 of the remaining 10 have died of hemorrhage, and the others were alive when last seen ten months to six years after the first hemorrhage. There were also 6 patients with varices diagnosed by roentgenogram without overt bleeding. Follow-up of these patients shows that hemorrhage subsequently developed in 1

TABLE 2

<i>Cause of obstruction</i>	<i>Total cases</i>	<i>Good result</i>	<i>Postoperative death</i>
Alcoholic cirrhosis	23	14	7
Other cirrhosis	7	5	2
Congenital	2	2	0
Extrahepatic	5	2	0
	37	23(62%)	9(24%)

and was successfully treated four years later by a shunt. The others were followed four months to eight years after the initial diagnosis without evidence of bleeding. These data must be amplified, but as they stand they do not support the idea that nonbleeding varices require surgery. Subsequent surgical cases from the Veterans Hospital have been drawn from a similar group of patients, with the result that the alcoholic cirrhotics make up 19 out of the total of 26 patients. The 11 patients from the University represent a heterogeneous group (table 2), but the total population of hospital patients with portal hypertension from which it was drawn has not been studied.

ASCITES

While our patients were operated upon chiefly because of hemorrhage (table 3), 3 patients had a shunt operation primarily for treatment of ascites, which had proved intractable to hospital management. Two of these have been relieved of the ascites, but the third required a graft to bridge the stiffened veins, and this subsequently thrombosed. We were encouraged to attempt these operations because we had observed cessation of ascites formation in 4 (now 7) other patients in whom shunts were done primarily for bleeding. Although increased hydrostatic pressure alone is usually not responsible for ascites, as shown by the fact that it rarely occurs with

TABLE 3

<i>Primary indication</i>	<i>Total cases</i>	<i>Good result</i>	<i>Postoperative death</i>
Bleeding	32	19	9
Ascites	3	2	0
Hypersplenism	2	2	0
Bleeding and ascites	12	8	4
Bleeding and hypersplenism	8	4	2
All three	5	4	2

extrahepatic obstruction, our results suggest that this pressure plays a significant role and makes surgical treatment feasible. The magnitude of the operation is increased by the presence of thickened peritoneal membranes in patients with chronic ascites, and the rigidity of structures in the porta hepatis eventually may increase to the point where a shunt is hardly possible. These facts indicate that when the necessity for frequent tapping for ascites with portal hypertension persists in spite of adequate medical management, a shunt will probably be effective treatment, and it is more easily performed early in the course of the disease.

HYPERSPLENISM

Since congestive splenomegaly occurring with portal hypertension very frequently is associated with a low platelet count and an elevated fecal urobilinogen, the diagnosis of hypersplenism is sometimes made. We have so listed patients having a platelet count of 50,000 or less in table 3. Usually, this is not a major complication, though it may contribute to the bleeding tendency in these patients. After an effective portacaval shunt, the spleen soon is no longer palpable, and the platelet count and other pertinent tests show a gradual return toward normal. None of our patients with effective portacaval shunts has had any postoperative problem with hypersplenism. It therefore seems unnecessary to remove the spleen for hypersplenism if an effective shunt can be made. The spleen is not accessible through the incision used for a portacaval shunt. In 2 of our patients operated upon primarily for hypersplenism, varices were also present which had not bled. In 1 patient with cirrhosis, a splenectomy and splenorenal shunt were done, in view of a large splenic vein visualized preoperatively and the anxiety of several attending physicians that a portacaval shunt alone would not be successful. Portal pressure was reduced from 63 to 25 cm. of water. The patient has done well for one year. The other patient had a portacaval shunt, with a reduction of portal pressure from 36 to 18 cm. of water. The patient has remained asymptomatic for nearly three years. His obstruction was believed to be caused by Cruveilhier-Baumgarten disease, or congenital hypoplasia of intrahepatic portal radicles, and his entering complaint was huge abdominal wall varices, over which a hum could be heard with a stethoscope. These disappeared completely after surgery. His large spleen was no longer palpable after one month, or are varices any longer found on x-ray. Platelet counts ranged from 47,000 to 117,000 preoperatively

and from 47,000 to 208,000, the most recent value, postoperatively. Reticulocyte counts were 3 to 5 per cent preoperatively and 0.9 to 2.7 per cent postoperatively.

EFFECT OF ANATOMIC SITUATION

Anatomic relationships determine the feasibility of an adequate shunt procedure. The operation can be curative in 1 group of patients, those usually young persons with extrahepatic portal obstruction, but there are only a few with a single large splenic vein of adequate length to reach the renal vein. In the others, the splenic vein is divided into 2 or more tributaries which are approximately of pencil size and in which anastomoses are likely to thrombose and unlikely, even when open, to provide effective lowering of pressure. Of 8 splenorenal shunts in the present series, only 3 were effective in reducing portal pressure below 30 cm. of water. Many of these patients must be treated by other surgical means, such as partial esophagogastrrectomy.³ Attempts to use venous autografts in bridging separations of the veins have seldom been permanently successful. Our 2 cases were failures.

The importance of knowing the anatomic situation has led us to use preoperative splenograms routinely. Usually, the feasibility of a splenorenal shunt can be assessed accurately from the films, and the presence of a patent portal vein can be determined. It seems evident that where the anatomy is unfavorable, an attempt at a shunt operation using a small vein or graft is probably unwise. In the present series, many hours of tedious operative work produced no success in this group of 4 cases (2 grafts and 2 explorations, table 1).

LIVER FUNCTION AND MORTALITY

The fact that in many cirrhotic patients, liver function continues to deteriorate gradually over variable periods of time makes late results in these individuals inevitably poor, but prevention of hemorrhages and ascites formation by surgery can only be beneficial in this respect.

From a surgical point of view, the important question is whether a patient has sufficient liver function reserve to carry him through an operation. All our mortalities occurred in patients with seriously impaired liver function (table 2).

In this series, there were 9 deaths, of which 4 were directly and 2, perhaps, indirectly a consequence of liver failure. In 3 of these 6 patients, the Bromsulphalein retention (BSP) exceeded 30 per cent at forty-five minutes; the serum albumin was reduced to 3 gm. or less; and the prothrombin was less than 50 per cent of normal.

A successful shunt was made under local anesthesia in 1, but coma and bleeding caused death in one month. In the other 3 patients, 1 or 2 of these tests showed impairment exceeding the limits given. There was no striking correlation of mortality with the other tests performed, including zinc and thymol turbidity, cephalin-cholesterol flocculation, serum bilirubin, and urine urobilinogen. One of the patients with borderline function underwent transthoracic ligation of varices for acute hemorrhage. Liver function was thereafter much worse, and a recurrent hemorrhage after three weeks caused death. Another patient in this group died of an overdose of succinylchloride administered with Pentothal anesthesia. Respiration was never resumed, even after twenty-four hours in a respirator.

Two deaths occurred with recurrent hemorrhage postoperatively after prolonged unsuccessful attempts at making an effective shunt where the anatomic situation was unfavorable. The final death occurred in a patient who persistently bled after a portacaval shunt, splenorenal shunt, and esophagogastrectomy, which were performed at two-week intervals. Both shunts were open at postmortem, and the cause of failure is unknown.

MEAT INTOXICATION AND HEPATIC BLOOD FLOW

There is no doubt that diversion of portal blood from the liver contributes to the phenomenon of ammonia intoxication, but liver function tests are little changed by the procedure. Patients with extrahepatic obstruction usually have normal liver function and do not suffer from meat intoxication. A few of our portacaval patients have manifested this syndrome, but it has been easily managed. The argument sometimes advanced that a splenorenal or side-to-side portacaval shunt is more physiologic than end-to-side portacaval is not convincing because of the facts just cited, though less meat intoxication would be expected with a less effective surgical shunt. Nevertheless, more information about changes

in hepatic blood flow with various shunt procedures may be of value. We have found an increase of 10 per cent in hepatic artery flow upon tying off the portal vein in 1 patient (figure 1). This single measurement was made using an electromagnetic flowmeter without constricting or entering the artery. The result agrees with the reciprocal relation between the 2 hepatic inflows observed experimentally.⁴ It may help to explain why liver function does not deteriorate after division of the portal vein.

DISCUSSION

In all published series, the adequacy of patient selection for surgery can only be determined by knowledge of the total group of patients with portal hypertension, with follow-up of those who were not operated upon as well as those who were. We do not have such knowledge to any extent and cannot adequately substitute for it by comparing various series of medically treated or untreated patients from different hospitals, because the groups are not comparable with respect to etiology, age, type of treatment, and so forth. As a result, we can only surmise that when a small proportion of patients with complications of portal hypertension is referred to surgery, errors of omission in the selection of patients for operation are being made, and deaths that are probably avoidable by proper surgical treatment are occurring. The errors of commission, on the other hand, are obvious in the form of operative failures and mortality.

In our own group, if we had refused to operate on patients in whom liver function tests were worse in any particular than the values previously listed and, likewise, in patients whose anatomic relations were unfavorable as suggested by a preliminary splenogram or venogram, there would have been 22 operations — 19 (86 per cent) good results and 2 (9 per cent) deaths. Results in the 15 patients who would have been excluded from surgery by these criteria, however, were good in 4 (27 per cent), although there were 7 deaths (47 per cent). Although these data do not provide absolute criteria of operability by

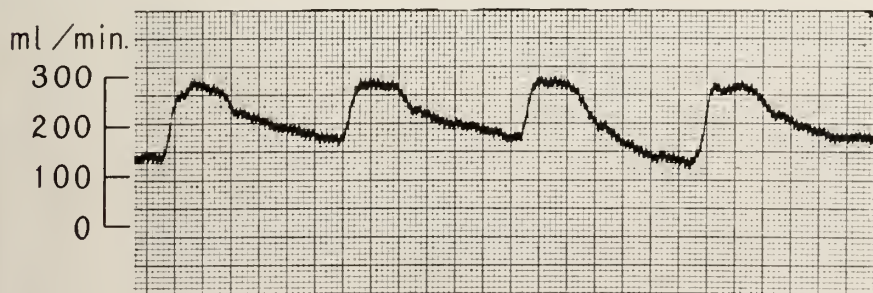


Fig. 1. Tracing of blood flow from hepatic artery in a patient undergoing portacaval shunt. Diastolic flow varies with respiration. Tracing is slightly damped because of excessive 60-cycle interference in the operating room. Mean flow (not shown) increased 10 per cent when the portal vein was occluded.

which all the favorable, and only the favorable, cases might be selected, there are 2 conclusions to be drawn: (1) mortality was 100 per cent when the BSP exceeded 30 per cent, serum albumin was 3 gm. or less, and prothrombin was less than 50 per cent of normal; and (2) no permanently successful shunts were obtained when the anatomic situation was unfavorable.

CONCLUSIONS

1. More exact knowledge of the course of medically and surgically treated esophageal varices, whether bleeding or not, is necessary before the indications for surgery can be made precise.

2. Surgical treatment of bleeding varices is 86 per cent effective in patients with reasonably good liver function, in whom the anatomic situation permits a large portacaval shunt. In this series of 40 operations in 37 patients, there were 9 deaths, all in those with impaired liver function.

3. Ascites intractable to medical management, occurring with cirrhosis, can usually be relieved by a portacaval shunt, but the operation becomes less feasible if the ascites has been present for a long period.

4. It is unnecessary to remove the spleen for hypersplenism resulting from portal hypertension if a large portacaval shunt can be made.

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SEVERE PERITONITIS can usually be alleviated by lavage of the peritoneal cavity with saline containing antibiotics, removal of the source of contamination, and systemic administration of antibiotics postoperatively.

The abdomen is opened to expose the peritoneal cavity, and a saline solution containing 1,000,000 units of penicillin and 1 gm. of streptomycin per 500 cc. is used to wash the peritoneum until all pus and foreign matter have been removed. Adhesions and barriers are gently broken down to destroy any hiding place for bacteria and permit all surfaces to be bathed in the antibiotic solution. The source of contamination is then eliminated, if possible. Approximately 500 to 1,000 cc. of the antibiotic solution is left in the peritoneal cavity, and the abdomen is closed. A Babcock rustless steel sump drain may be inserted; this is removed in one to three days if no more pus is aspirated. Antibiotics are given systemically for two or three days after operation.

Recovery is usually prompt after lavage, even in patients with appendical rupture, greenish-black peritoneal surfaces, and abundant, odorous pus.

This method of treatment may also be employed for patients with peritonitis who are too ill for definitive operation. A local anesthetic is given and a steel sump drain inserted into the pelvis guided by a finger in the rectum. After as much purulent material is aspirated as possible, the antibiotic solution is flushed into the abdomen and allowed to overflow. This procedure may be repeated several times. Peritoneal lavage decreases sepsis without causing systemic disturbance.

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A Comparison of the Toxicity of Various Agents Used in Coronary Arteriography

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CORONARY ARTERIOGRAPHY shows promise as a diagnostic procedure, particularly with reference to selection of cases suitable for direct and indirect surgical attack upon diseased coronary arteries. This technic might prove valuable also as a method of objectively evaluating the postoperative results of procedures performed to increase or improve myocardial blood supply. Coronary arteriography has been shown to be an accurate and feasible diagnostic tool in the experimental animal, and several reports of results on human beings are available in the literature.^{1,2} However, human mortality has been reported, and this fact prompts a study of the toxicity as well as the efficiency of some of the radiopaque dyes which are currently available.^{3,4}

METHODS

This study was performed on normal adult mongrel dogs. Coronary arteriograms were performed by inserting a catheter into a peripheral artery, usually the carotid, and advancing it so that its tip lay in the ascending aorta just above the coronary ostia.⁵ Although one can usually feel the vigorous shocks which are transmitted along the catheter when the aortic cusps are reached, we routinely checked the position of the catheter tip by fluoroscopy. A No. 280 polyethylene tube was used in most of these studies, and it was rendered fluoroscopically visible by filling it with the material being tested. Direct writing electrocardiograms were obtained before, during, and after the injection. A roentgen plate was exposed at the end of the injection, and the picture obtained was observed for detail.

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RESULTS

A study of Renografin — 30 and 60 per cent, Hypaque — 50 and 90 per cent, Neo-Iopax — 75 per cent, Urokon — 70 per cent, and Diodrast — 70 per cent was completed on 50 animals. An attempt was made to establish a critical level below which dosage injection was uniformly safe and above which dosage the injection was attended by a high mortality. The dosage was expressed in cc. per kilogram of body weight. It is felt that the establishment of such a minimum lethal dose for each dye represented a valid basis for comparison of the relative toxicity of the various materials (table 1). The 30 per cent solution of Renografin proved to be the least toxic to the heart of all the materials. Dosages up to 8 cc. per kilogram of the 30 per cent solution were tolerated, while amounts up to 7 cc. per kilogram of the 60 per cent solution were tolerated. Dosages up to 5 cc. per kilogram of 50 per cent Hypaque and 70 per cent Diodrast were tolerated, whereas only 2 cc. per kilogram of 70 per cent Urokon, 75 per cent Neo-

TABLE 1
MAXIMUM DOSAGES TOLERATED AND INITIAL EVENT
IN THE EPISODE OF DEATH

Dye used	No. of dogs	Maximum dose/kilo tolerated	Mode of death
Diodrast 70%	4	5 cc.	Convulsion
Hypaque 50%	10	5 cc.	Convulsion and ventricular fibrillation
Hypaque 90%	4	2 cc.	Ventricular fibrillation
Neo-Iopax 75%	5	2 cc.	Ventricular fibrillation
Renografin 30%	4	8 cc.	Convulsion
Renografin 60%	12	7 cc.	Convulsion
Urokon 70%	11	2 cc.	Convulsion

Iopax, and 90 per cent Hypaque were tolerated. In those dogs which were killed by high dosages, the dyes appeared to be more neurotoxic than cardiotoxic, inasmuch as deepening respiration, evacuation of bladder and bowel, and, finally, convulsions occurred without significant cardiac arrhythmias being manifest on the electrocardiogram. The electrocardiographic abnormalities included T wave inversion, S-T segment elevation, pronounced slowing, and, in some instances, death from ventricular fibrillation. If there was marked EKG aberration, the animals invariably succumbed. If the dogs survived the first twelve hours, they all lived to become apparently normal dogs without evidence of neurologic or cardiac difficulty.

When the drugs were evaluated on the basis of the technical perfection of the arteriogram produced, it was found that 90 per cent Hypaque produced the most detailed picture. All of the dyes used produced satisfactory arteriograms, but those that were more concentrated produced the sharpest pictures. The 2 most satisfactory dyes when both toxicity and quality of picture were evaluated were found to be 50 per cent Hypaque and 70 per cent Diodrast (figure 1).

DISCUSSION

Successful coronary arteriography depends upon several factors. First, the tip of the catheter used must be accurately placed. Some investigators have felt that if a lesion is suspected in a specific artery, an attempt should be made to aim the catheter in the direction of the origin of that artery.⁶ Timing of the exposure is obviously extremely important. Some of our arteriograms were exposed by an automatic tripping device, but most were exposed by the technician upon signal from the operator. Timing in relation to the phase of the cardiac cycle also seemed to be important. The fact that those films which showed a nonopaque jet emitting from the left ventricle, and, thus, were assumed to have been taken while the ejection phase of systole was occurring, universally showed poor filling of the coronaries. Best coronary arteriograms are obtained during the phase of coronary filling (diastole). Concentration of the dye also contributes to success. Using a highly concentrated dye is important, but any dye quickly becomes diluted if it is not injected rapidly. We injected the dye as rapidly as possible manually.

Successful arteriograms may be obtained if a concentrated dye is injected rapidly during diastole even with amounts as small as 4 to 6 cc. This is a dosage of roughly 0.25 cc. per kilo-



Fig. 1. Example of arteriogram performed with 50 per cent Hypaque. Animal survived.

gram. It is, therefore, apparent that there is a rather large margin of safety in the normal dog. We are currently investigating the effects of similar concentrations upon dogs which have had recent and longstanding coronary occlusions by means of ligature. At present, these animals appear to be somewhat less tolerant of the high dosages near the critical level but not markedly so. In our laboratory, many coronary arteriograms have been done as a diagnostic procedure on animals which have had one or more coronaries ligated. In order to obtain the best possible picture, several repetitions of the injection were often done. Although these were done with a small dosage, practically no difficulty was encountered.

A reliable method of coronary arteriography should include an automatic mechanical injection synchronized with an automatic triggering device activated by the electrical impulse of the heart so that a rapid exposure could be taken with the heart in the optimum phase of coronary filling.

With such a technic, it should be possible to obtain coronary arteriograms of good technical quality with a small amount of dye and infrequent repetitions, and, hence, we feel that this should be a safe procedure.

SUMMARY

We have tested several radiopaque dyes for toxicity when injected in the immediate vicinity of the coronary artery ostia and have found that 30 per cent Renografin is the least toxic but the poorest in contrast quality. Ninety per cent Hypaque produced the best contrast but was one

of the most toxic. On the basis of safety and excellence of contrast, 50 per cent Hypaque and 70 per cent Diodrast were found to be the best agents.

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A SYNDROME caused by parietal pericardial fat necrosis is denoted by pleuritic chest pain and a juxtacardiac mass in the thoracic roentgenogram. The condition is apparently related to obesity.

Typically, low anterior chest pain is severe and sudden in onset. Pain subsides gradually in the course of about a week but recurs at frequent intervals. Distress is usually aggravated by deep breathing and coughing. Radiation to the left shoulder may be noted in some patients.

Palpation of the chest may evoke point tenderness. Laboratory findings, including serial electrocardiograms, are usually within normal limits.

Thoracotomy is necessary to establish the diagnosis. The mass is enveloped by moderate inflammatory reaction and may adhere to the anterior chest wall, diaphragm, lung, or pericardium. A pedicle may be apparent. The diseased tissue is readily excised by sharp dissection and consists of pale, brown, abnormally firm fat.

Microscopic sections show fat necrosis, lipid-laden macrophages, and pooling of fat in large spaces. Inflammatory exudate is slight. Most vessels are normal, but subintimal fibrosis of arteriols and thrombosis of venules may be noted. Bacteria cannot be isolated.

No explanation has been found for the occurrence of fat necrosis in this unusual location. The lesion has been observed in 2 men and 1 woman at the Mayo Clinic.

ROBERT C. JACKSON, M.D., O. THERON CLAGETT, M.D., and JOHN R. McDONALD, M.D., Mayo Foundation, Rochester, Minn. *J. Thoracic Surg.* 33:723-729, 1957.

A HOT AND HUMID ENVIRONMENT increases cardiac work and output, stroke volume, and tension upon the walls of the ventricles in healthy persons and in patients with congestive heart failure. Effect is more pronounced in healthy persons. Probably, increase in cardiac work and output is largely dependent upon increased stroke volume. In contrast, increase in output after exercise is more dependent upon accelerated cardiac rate.

Since heat and humidity place considerable stress upon the heart, a fairly cool and dry environment is most suitable for patients with cardiac disease. Such persons should govern their physical exertions by the climate.

G. E. BURCH, M.D., and ALBERT HYMAN, M.D., Tulane University, New Orleans. *Am. Heart J.* 53:665-679, 1957.

Complications Following Urinary Diversion Through A Segment of Ileum

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ISOLATED SEGMENTS OF ILEUM have proved useful for replacing or repairing parts of the collecting or storage systems of the urinary tract, except for the renal pelvis, when simpler or safer methods have been unsuccessful or inapplicable. Possible indications for these procedures are as follows:

- I. The bladder has to be removed.
Primary and secondary neoplasms.
- II. The bladder cannot be made to function adequately.
 - A. Neurogenic vesical dysfunction (congenital or acquired).
 1. Atonic bladder with large residual urine.
 2. Incompetent sphincters.
 3. Uncontrollable reflux with increasing hydronephrosis.
 - B. Irremediable urethral stricture.
 - C. Irreparable vesical fistula.
 - D. Serious congenital anomalies.
 1. Extrophy of the bladder.
 2. Epispadias not amenable to correction.
 3. Atonic bladder with congenital ureterectasis.
 4. Obstruction at the vesical neck with severe renal damage.
 - E. Inoperable vesical neoplasm (for palliation).
- III. To arrest renal damage from unsatisfactory ureterosigmoidostomy.
- IV. The bladder is severely contracted.
 - A. Tuberculous or posttuberculous.
 - B. Interstitial cystitis (Hunner's ulcer, submucous fibrosis).
 - C. Postinflammatory fibrosis (nonspecific infections).

- V. Part or all the ureter requires replacement.
 - A. Trauma from operation or irradiation with obliteration of long segment.
 - B. Primary or secondary neoplasm of ureter.
 - C. Congenital ureterectasis with functioning bladder.
 - D. Irremediable reflux.

To summarize, the ileum may be used to divert the urine temporarily or permanently; to enlarge or replace part or all of the bladder; or as a substitute for part or all of the ureter. Indications are not yet precisely defined, but space does not permit a detailed discussion of this aspect of the problem.

Pyrah and Raper¹ have evaluated those characteristics of the ileum which permit its use in the urinary tract. Chief advantages are its potentially long pedicle and the persistence of peristalsis after isolation. Disadvantages include the secretion of mucus, usually only a minor nuisance, and its ability to absorb electrolytes. The latter seems more important experimentally than clinically, since segments as long as 45 cm. have been used to replace the human bladder or ureter. Both Couvelaire² and Pyrah³ have substituted ileum for the whole bladder; the latter's patient had no electrolyte imbalance after six months. He and Raper¹ attribute this to a balance between secretion and absorption by the ileac mucosa.

It is not quite certain who first attached a segment of ileum to the human urinary tract. It is said that Mikulicz first used it to enlarge the bladder in 1898, but I cannot find the original report. According to Moore and associates,⁴ Shoemaker wrote to Melnikoff in 1909 about a patient with a solitary kidney and intractable cystitis whose urine he diverted through an isolated segment of ileum for eighteen months while the bladder healed. He then joined the ileac segment to the bladder and stated that the patient was well eighteen months later. Certainly, Scheele⁵ in 1922, was the first to report real clinical experience with enlargement of the

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bladder by attaching a loop of ileum to it; in 1940, Nissen⁶ described replacement of the lower segment of a damaged ureter; in 1948, Longuet⁷ used a U-shaped loop as a substitute for both pelvic ureters; and in 1954, both Rack and Simone⁸ and Baum⁹ reported replacing whole ureters with ileum. Recently, Kimura and associates¹⁰ improvised a male urethra from a segment of ileum with indifferent results with respect to urinary continence.

There is a considerable amount of experimental literature concerning these subjects, but space does not permit their review.

Whoever first diverted the urine through a loop of ileum, Bricker and associates¹¹ were responsible for arousing interest in it in the United States. The remainder of this paper will be devoted to this aspect of the problem. Thus far, this type of urinary diversion seems superior to ureterosigmoidostomy for the following reasons: (1) the only resistance to the passage of urine to the outside after a properly made ureteroileac anastomosis is that which may be inherent in an abnormal ureter itself; (2) there is no pressure to force urine back up to the kidneys; (3) admixture of urine and feces cannot occur; and (4) hyperchloremic acidosis, so often troublesome after ureterosigmoidostomy, is not a serious problem, presumably because the ileum serves as a conduit rather than as a reservoir. Moreover, the operation is practicable with widely dilated ureters and with relaxed anal sphincters, both of which contraindicate ureterosigmoidostomy, and renal function present at operation is likely to persist or even improve. There are two real disadvantages: (1) the need to wear an apparatus to collect the urine, fitting of which may at times be difficult, and (2) greater danger of early postoperative complications.

It is vastly superior to methods requiring use of an inlying catheter, such as nephrostomy, because of the thoroughly documented dangers arising from a foreign body in the urinary tract (infection, stones, plugging of catheters).

The greater likelihood of early postoperative complications stems from the fact that there are four suture lines which can leak as compared with two in ureterosigmoidostomy. Another complication is the greater predisposition to intestinal obstruction, including diaphragm at the ileoileostomy; openings in and beneath the mesentery through which bowel may slip; and, later, particularly after cystectomy or exenteration, the formation of adhesions. Care and experience can diminish but not eliminate these disadvantages. When ileac diversion of the urine alone offers comfort or prolongation of

life, its advantages outweigh its disadvantages.

The operation is tedious rather than difficult, and attention to small details is rewarding. The bowel is prepared with Sulfathalidine and neomycin (Poth).¹² Nasal suction is begun before and continued during operation, lest the anesthesiologist inadvertently inflates the bowel, particularly in infants, thus creating needless technical difficulties. The necessarily long incision is to the left of the midline to leave room on the right for the collecting apparatus. Immediately after abdominal exploration, the nasal tube is guided manually into the duodenum or upper jejunum. Next, a hole equal in circumference to that of the ileum is made halfway between the right anterior superior spine and the umbilicus by excising the whole thickness of the abdominal wall. A loop of terminal ileum is next selected so that it will lie without tension on its mesentery upon the *outer surface* of the hole. It is divided at this point between Dennis clamps. The oral end of the divided ileum is drawn through the hole until it protrudes about an inch and one-half in the adult and is sutured to peritoneum, fascia, and skin. The ileum is made to protrude to permit use of the Perry bag, which requires no cement but which will not work with a flush external stoma.

The ureters are next divided deep in the pelvis and allowed to drain. Any resulting reduction in lengthening or dilatation will facilitate accurate placement of the anastomoses. The ileum is now divided just to the left of the left ureter, which aids in making a loop of the right length. Its open end is closed with care, and terminolateral anastomoses are made between the spatulated ends of the ureters, and openings of appropriate size are made with blunt scissors in the posterior surface of the isolated segment. Full thickness of ureter is joined to full thickness of ileum with fine catgut in a single accurately placed layer. The right edge of the segment's mesentery is sutured to the parietal peritoneum lateral to and beneath the cecum, removing the appendix if it is in the way. The left edge of the same mesentery is sutured to the posterior parietal peritoneum or to the sigmoid, depending upon whether the left ureter has been brought up beneath or over the sigmoid. Care must be exercised both in trimming the ureters to the right length before anastomosis and in tacking down the mesentery afterward, so that there is no tension whatever between ureters and ileum.

All sutures in the urinary conduit are fine chromic catgut (0000 or 00000); nonabsorbable material may work into its lumen and cause the formation of stones.

An ileoileostomy, usually with a single row of silk, such as Wangenstein¹³ uses, restores intestinal continuity, after which the cut edges of the mesentery are carefully united. The abdominal wall is closed in layers with silk in patients who are good risks or with through-and-through stainless steel in poor risk patients.

A Perry or Rutzen bag is applied, the former preferred because it requires no cement and permits dilatation of the stoma without disarranging the apparatus. No catheter is inserted into the ileum because mucus so often plugs it, and because Rack and Simeone⁸ have reported an instance of uncontrollable hemorrhage from the ileac mucosa while a catheter was in place.

Good postoperative care is imperative. The nasal suction is watched closely, the patient is weighed daily, and electrolyte balance is maintained. If cramps or distention occur despite apparently satisfactory suction, an additional tube is inserted to keep the stomach empty, a function sometimes not performed by a tube in the duodenum or jejunum. When normal peristalsis is audible and the patient is passing gas, the tube is clamped for eight hours and then withdrawn if everything goes smoothly. The patient or parents are taught to care for the apparatus as soon as possible, with emphasis on keeping the stoma dilated.

RESULTS

Results are difficult to assess both because our first operation dates back only three and a quarter years and because 42.5 per cent of our patients had advanced malignant disease. Below is a summary of complications in 406 cases collected from the literature (Wells,¹⁴ 212; Bricker and associates,¹¹ 106; Cordonnier,¹⁵ 41; Nash¹⁶ and Rickham,¹⁷ 25; and Wawro,¹⁸ 22 cases. There were 77 deaths, or 19 per cent).

Urinary infection	48
Ileus	43
Intestinal obstruction	31
Urinary fistula	24
Progressive hydronephrosis	20
Dehiscence wound	17
Fecal fistula	12
Stenosis external stoma	11
Peritonitis	10
Sensitivity to cement	8
Pulmonary embolism	7
Thrombophlebitis	6
Convulsions	5
Surgical shock	5
Uremia	5
Infarction isolated loop	5
Oliguria, anuria	4
Nephrolithiasis	3
Ileovaginal fistula	1

265

The following complications have been encountered in our own 47 cases.

Intestinal obstruction	7
Early	5
Late	2
Hyperchloremic acidosis	7
Preexisting	5
Postoperative	2
Breakdown wound	3
Stenosis stoma	3
Uremia	2
Peritonitis	2
Persistent ileus	2
Pyelonephritis requiring nephrostomy	2
Infarction intestine	1
Gastric hemorrhage	1
Magnesium deficiency	1
Osteitis pubis	1
Leakage isolated loop	1
Disruption ureteral anastomoses	1
Ileourethral fistula	1
Unable to keep dry	1

Postoperative intestinal obstruction required operation 7 times. In 2 of these patients, it occurred months after urinary diversion and resulted from spreading cancer. Of the 5 patients in whom convalescence was interrupted, diaphragms at the ileostomy were the causes in 2, and in 2 more, it resulted when a loop of small bowel slipped beneath the mesentery of the isolated segment. All 4 cases probably reflect inexperience on the part of the surgeon. The last resulted from ileoileac intussusception well above the anastomosis and could not be explained.

Origin of the 2 cases of persistent ileus is not clear, but 1 caused a magnesium deficiency because the patient subsisted for a long period on parenteral fluids which contained none. This condition was recognized at once by the medical consultant, Dr. E. B. Flink. More baffling was a furious gastric hemorrhage in a 30-year-old former paraplegic patient. Subtotal gastrectomy was followed by immediate cessation of bleeding, but no lesion was found in the removed portion of the stomach. He recovered.

The leakage of a loop probably resulted from perforation of its opposite wall by the knife used to make the openings for ureteral anastomosis. Separation of the ureters from the ileum apparently was due to too much tension, both from improper placement and from intestinal distention secondary to obstruction. The osteitis pubis was mild and followed cystectomy. Stenosis of the stoma, severe enough to demand surgical relief, occurred in 2 patients in whom the protruding end of the ileum was everted upon itself; this maneuver has been abandoned. The third involved a simple end opening, which responded to dilation. Secondary stasis in the loop aggravated a pre-existing hyperchloremic acidosis in the first of the three.

"Unable to keep dry" refers to an elderly obese female with an ureterosigmoidostomy done elsewhere many years earlier. This procedure had been followed by a nephrectomy for pyonephrosis and then by a nephrostomy. She sought relief for recurrent right renal pain with chills and fever despite a well-functioning nephrostomy. In an effort to make the end of the ilcum protrude above the skin, some of her overabundant subcutaneous fat was excised. This excision made a depression around the stoma on which the bag could not be fitted properly. Although relieved of original complaints, she refused to return for refitting. This problem appears to be psychiatric.

The ileourethral fistula followed cystectomy and closed and opened intermittently. Since the patient later died, apparently of carcinomatosis, there may have been ncoplasm in the area at the time the fistula appeared.

MORTALITY

In view of the frequency of complications after ileac diversion of the urine, it is surprising that only 3 deaths followed our 47 operations, especially if one considers the types of lesions for which operations were done and the number and variety of surgical proccdures preceding urinary diversion. Our indications so far have been:

<i>Congenital anomalies</i>	
Obstruction vesical neck	5
Exstrophy	4
Ureterectasis	4
Neurogenic dysfunction	3
Urethral stricture with reflux	1
Absence abdominal muscles	1
	—
	18
<i>Acquired benign disorder</i>	
Ureterosigmoidostomy	2
Posttuberculous reflux	2
Postparaplegic	2
Rectovesicovaginal fistula	1
Ureterovaginal fistula	1
Irreparable urethral stricture	1
	—
	9
Benign lesions 27 (57.5 per cent).	
<i>Malignant disease</i>	
Bladder	16
Bladder and prostate	1
Cervix	2
Female urethra	1
	—
	20
(42.5 per cent)	

In 3 of our 47 patients, urinary diversion was needed because of complications of a preceding operation (1 hysterectomy, 2 ureterosigmoidostomies). In addition, 29 operations had already been done for the underlying disorder or its complications:

Plastic vesical neck	7
Nephrostomy	5
Unilateral	2
Bilateral	3
Permanent cystostomy	4
Nephrectomy	4
Partial cystectomy	2
Reimplantation ureter	1
Colostomy	1
Closure exstrophy	1
Construction loop only	1
Shortening ureters	1
Urethrotomy (stricture)	1
Fascial loop (incontinence)	1
	—
	29

Cystoscopic biopsies, electrocoagulations, and transurethral resections for bladder neoplasms or contracted vesical neck are not compiled.

The 3 patients who succumbed during the postoperative period all came to autopsy. The first, a male of 64, died eight days after cystectomy for advanced vesical cancer, with septicemia (paracolon bacillus) and multiple septic intestinal infarcts. The second, a male of 4½ months, had advanced hydronephroses from obstruction at the vesical neck, which was unaffected by a plastic operation and cystostomy. He died four days after ileac diversion of the urine from pyelonephritis, uremia, and peritonitis. The third, a male of 4 months, who was born without abdominal muscles, had chronic urinary retention, hydronephroses, and a megalourcthra. Since a plastic operation on the vesical neck and cystostomy at the age of 1 month failed, the urine was diverted. Persistent abdominal distention led to exploration on the eleventh postoperative day; an obstructed loop of bowel had perforated, and the ureteral anastomoses had separated. The bowel was resected and cutaneous ureterostomies were performed, but he died after twelve days.

It is always tempting and often profitable to speculate on how a postoperative death could have been avoided. The first fatality occurred in a good surgical risk. The operation proceeded uneventfully, and the patient received adequate antibiotic therapy, yet succumbed to septicemia. It seems that death could have been prevented only by abstaining from operation. The other 2 patients were desperately poor risks, and one can argue that they should have been allowed to die undisturbed. They were examples of "nothing ventured, nothing gained." Prompter recognition of postoperative complications might have yielded a different result in the third case.

The 5 known late deaths all followed operation for extensive malignant disease, in only 1 of whom was there any hope of cure. It was

sought to ascertain whether palliation could be achieved without the risks to the kidneys inherent in ureterosigmoidostomy. There have been several unexpectedly gratifying results, but there will be more deaths from spread. This procedure, supplemented by cystoscopy electrocoagulation and by irradiation with the cobalt beam, is still on trial as a means of palliation in inoperable vesical cancer.

EFFECTS UPON UPPER URINARY TRACT

It is too soon to draw accurate conclusions concerning the late effects of ileal diversion of the urine upon the upper urinary tract. To do so will require long follow-up studies in patients without malignant disease to cloud the issues. In general, one may say at this point that, in the absence of strictures at the ureteral anastomoses, the kidneys and ureters are likely to remain in statu quo or to improve if mechanical obstruction preceded operation. One large hydronephrosis in a solitary kidney with a posttuberculous stricture in the intramural ureter grew worse after ureteral reimplantation but has returned to normal during the two and one-half years which have elapsed since urinary diversion. A similar one has improved remarkably after six months. Two previously normal kidneys have become hydronephrotic since operation, whether from strictured anastomoses or from recurrent cancer remains to be determined. Previously hyperchloremic patients have remained so. The condition has developed for the first time postoperatively in two others, both with neoplasms. Two previously hydronephrotic kidneys have required temporary nephrostomy for persisting pain, chills, and fever. Both patients have remained well after removal of their tubes.

It has been disappointing thus far to observe little or no regression in hydronephroses from congenital ureterectasis. However, only 1 of 4 has grown worse, and this was attributable to stenosis of the external stoma, which is now cor-

rected. It may be better in these circumstances to replace the ureters with narrowed segments of ileum as suggested by Swenson and associates,¹⁹ although this is not applicable if the bladder does not function normally.

One may safely conclude, on the basis of experience thus far secured, that diversion of the urine through an isolated segment of ileum offers less of a threat to the integrity of the kidneys than any other method so far devised; that it permits relief, hitherto unattainable, of congenital urinary incontinence; and that it allows diversion of the urine in patients with ureters so dilated, kidneys so damaged, and with anal sphincters so weak that ureterosigmoidostomy is forbidden. It will be interesting to observe the really late effects upon the kidneys. Thus far, the most grateful patients have been those with irreparable urinary incontinence and those with permanent cystostomies.

SUMMARY AND CONCLUSIONS

1. Reports are presented of 47 patients in whom the urine was diverted through an isolated segment of ileum with an external abdominal stoma, as advocated by Bricker and associates.¹¹

2. Twenty of the patients had extensive malignant disease of the lower urinary tract. All but 2 procedures were intended to be palliative.

3. Twenty-seven patients had a variety of non-malignant disorders not amenable to less drastic procedures.

4. There were 3 surgical deaths, a mortality rate of 6.4 per cent.

5. All 5 known late deaths were apparently due to cancer rather than to urinary diversion.

6. Complications are more common in the immediate postoperative period after this operation than after ureterosigmoidostomy, but there are far fewer adverse late effects upon the kidneys.

7. This procedure offers considerable promise in the treatment of hitherto irremediable disorders of the urinary tract.

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Neonatal Gastrointestinal Tract Perforations

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MECONIUM PERITONITIS is definitely not a new entity. Simpson¹ collected 25 cases from the existing literature in 1838, and succeeding authors^{2,3} have augmented his report. Thelander² in 1939, after an extensive literature review, reported 85 cases of spontaneous rupture of the gastrointestinal tract, only 1 of whom survived. The medical literature has since been dotted by isolated reports of similar cases, a few of whom have survived following surgical correction.^{4,5}

This report will summarize the records of 5 newborn infants with gastrointestinal tract perforations observed at the University of Minnesota Hospital during the past three years. Four of these infants survived after surgical correction of the defect. It is hoped that this report may reawaken the reader's interest in this problem, for the signs and symptoms are sufficiently vague so that diagnosis is difficult unless one has a high index of suspicion. Prompt recognition and treatment of the entity can be conducive to a high survival rate.

CASE REPORTS

Case 1. W. J., an 8-day-old female, was the product of a very prolonged labor, and there was difficulty in resuscitating the infant. On her fourth day, the child had a choking spell accompanied by cyanosis. A chest x-ray at this time demonstrated a pneumoperitoneum. She was then referred to the University Hospital. Amazingly enough, even though the peritonitis was known to have been present for at least four days, she did not appear acutely ill at the time of her hospital admission.

The patient was operated on, and a tiny perforation was noted between the first and second portions of the duodenum; this was closed with 3 interrupted 5-0 silk sutures, and the peritoneal cavity was thoroughly gavigated with saline.

Postoperatively, she was given penicillin and streptomycin and maintained on gastric suction for three days. At the end of this time, oral feedings were begun. The child experienced a nonventful postoperative course.

Case 2. D. La B., a 14-hour-old female, was admitted to our hospital because of pronounced abdominal distention at birth. She had been bronchoscoped prior to admission in order to alleviate a left-sided atelectasis. There had been numerous episodes of cyanosis, and she had passed no stools since birth. Examination revealed a well-developed newborn infant with a lusty cry and obvious abdominal distention. The abdomen felt doughy,

and no bowel sounds could be heard. Flat, upright, and Trendelenburg films of the abdomen revealed free air and fluid within the peritoneal cavity plus stippled calcification along the liver edge, underneath the left diaphragm, and within the pelvis (figure 1).

A diagnosis of meconium peritonitis was entertained, and surgery was advised. At the time of the laparotomy, a large accumulation of meconium-stained fluid gushed from the incision. The small bowel was observed to be bound by extensive adhesions into a ball-shaped mass, and there was evidence of an extensive inflammatory reaction over the entire peritoneal surface. The adhesions were lysed, mobilizing the small intestine from the ligament of Treitz to the terminal ileum. A small perforation was demonstrated on the antemesenteric border of the ileum approximately 2 to 3 in. from the ileocecal valve. A double-barrelled ileostomy incorporating the perforation was formed, and this was brought through the skin via a separate incision. The peritoneal cavity was thoroughly gavigated with warm saline and the incision closed after instillation of penicillin and streptomycin. A culture of the contaminated peritoneal fluid proved it was sterile.

The postoperative course was rather stormy with numerous bouts of atelectasis and pneumonia. In addition, the ileostomy drainage loss provoked a significant electrolyte balance problem. The ileostomy spur was crushed on the eighteenth postoperative day, following which she began passing stools per rectum; the ileostomy drainage diminished, and the electrolyte problem lessened. Two months after the initial procedure, the ileostomy was closed extraperitoneally, following which a small fecal fistula developed in the wound. This closed spontaneously at the end of two to three weeks.

The youngster was last seen in our out-patient clinic at the age of fifteen months. She appeared perfectly normal at this time.

Case 3. W. H., a 4-day-old male infant, the second of twins, was admitted to the University Hospital because of abdominal distention. His delivery had been uneventful. On the first and second days of life, he passed meconium stools. After initiation of formula feeding on his third day, he became distended and started vomiting. Examination revealed an alert infant with a moderately distended abdomen and considerable inflammatory reaction over the abdomen surrounding the umbilicus. Bowel sounds were absent. X-rays (figure 2) revealed free peritoneal fluid plus a pneumoperitoneum.

The infant was taken to the operating room following the x-ray examination. On opening the abdomen, a great deal of greenish-yellow material extruded, and a moderate fibrous reaction was observed on the loops of bowel in the right lower quadrant. The small bowel was examined throughout its length, and a perforation was found in the region of the terminal ileum. The bowel proximal and distal to the defect was normal. It was judged from the nature and the degree of the reaction that the perforation had occurred quite recently. The defect was closed transversely with interrupted 5-0 silk sutures. The abdomen was next rinsed thoroughly with warm saline, penicillin and streptomycin were instilled, and the wound

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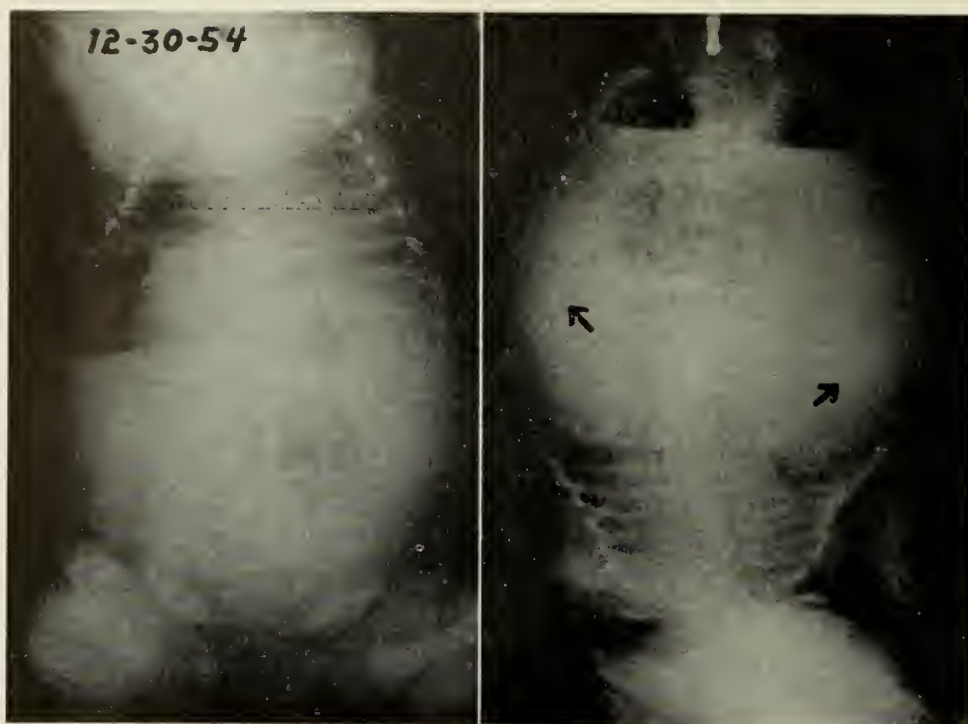


Fig. 1. Case 2. Flat and upright films of abdomen. Note stippled areas of calcification indicated by arrows.

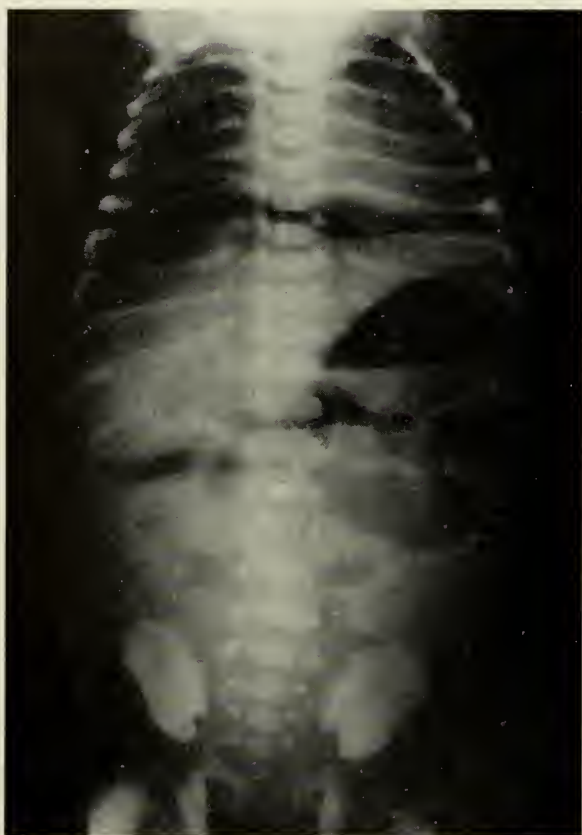


Fig. 2. Case 3. Upright film of abdomen. Note collection of gas over liver on right side.

closed. Culture of the peritoneal fluid grew out *Aerobacter aerogenes* and *Escherichia coli*. Gastric suction and intravenous fluids were maintained for three days followed by oral alimentation. Penicillin and streptomycin were given until the results of the culture became known. These antibiotics were then discontinued in favor of Achromycin, which was maintained until two days before his discharge. His postoperative course was smooth, and he was discharged from the hospital on his twentieth postoperative day. When last seen in the outpatient department at the age of six months, he was doing nicely.

Case 4. U. H., a 4-day-old boy, was referred to our hospital because of abdominal distention. He had had a meconium stool the first day and had passed normal colored stools on each succeeding day up until the time of his admission. On the fourth day, he began vomiting and became very irritable. Physical examination revealed a normal infant, except for the pronounced abdominal distention and absence of bowel sounds. An enormous degree of gastric dilatation was shown by x-ray (figure 3). A small amount of gas was also visualized in the upper small bowel but none in the large bowel. Barium enema was noncontributory.

A diagnosis of intestinal obstruction was made, and he was taken to the operating room where laparotomy revealed an incomplete bowel rotation with the cecum lying in the right upper quadrant. Numerous adhesions between the cecum and posterior parietes constricted the third portion of the duodenum. In addition, greenish-colored fluid was scattered throughout the peritoneal cavity with little evidence of an inflammatory reaction of the peritoneum. Further examination demonstrated two jagged rents in the stomach along the greater curvature. Following the closure of the gastric perforations with interrupted 4-0 silk suture, the adhesions were lysed, thus freeing up the cecum and enabling us to place the entire colon in the left side of the abdomen. This

maneuver effectively relieved the duodenal obstruction. After thorough gavage of the peritoneal cavity with warm saline, penicillin and streptomycin were instilled and the wound closed in layers. Gastric suction plus intravenous fluid supplementation were maintained for five days, and, at the end of this period, he was started on formula by mouth. Culture of the peritoneal fluid subsequently revealed *Escherichia coli*, *Aerobacter aerogenes*, and alpha streptococci. He was initially given penicillin and streptomycin, but, on receipt of the culture report, these were changed to Achromycin. His postoperative course was smooth, and he was able to be discharged on his fourteenth postoperative day.

Case 5. M. C., a 3-day-old male infant, was referred to the University Hospital because of abdominal distention, vomiting, and cyanosis. Physical examination revealed a moribund infant in obvious shock with tremendous tympanitic abdominal distention. No bowel sounds were audible. X-ray showed a large pneumoperitoneum (figure 4).

His peritoneal cavity was aspirated of the gas, and blood was given. Following this, he showed significant improvement, and he was then taken to the operating room where surgery revealed bowel content scattered throughout the peritoneal cavity. An irregular perforation 2 cm. in length was present high on the anterior surface of the stomach. Further examination showed marked cyanosis of the entire small bowel due to a volvulus and compression of the superior mesenteric artery. Even after relief of the volvulus, the bowel remained mottled in color and the viability was very questionable. The rotation of the colon was incomplete in that the cecum was found in the right upper quadrant where the

numerous adhesive bands anchoring it to the parietes had obstructed the duodenum. These bands were lysed, and the colon was then displaced to the left side of the abdomen, thus effectively releasing the duodenal obstruction. The peritoneal cavity was then irrigated with warm saline, and penicillin and streptomycin were instilled into the peritoneal cavity prior to wound closure. Culture of peritoneal fluid eventually presented coliform organisms.

The infant expired approximately four hours postoperatively. Post-mortem examination confirmed the diagnosis of small bowel infarction and also demonstrated a bacteremia of coliform organisms.

DISCUSSION

The clinical picture of neonatal bowel perforation most frequently is that of an acutely ill infant with pronounced abdominal distention and respiratory distress due to the diaphragmatic elevation and vomiting of bile-stained material. Peristalsis is usually absent, and the temperature can be elevated, normal, or hypothermic. It is quite apparent that these findings are in themselves nondiagnostic. However, as can be appreciated by figures 2 and 3, the diagnosis can usually be made relatively easily with the aid of a flat and upright film of the abdomen. Occasionally, in those cases where the pneumoperitoneum is not so great, the calcification presented in figure 1 will be a necessary adjunct



Fig. 3. Case 4. Note tremendous dilatation of stomach plus some gas in small bowel.



Fig. 4. Lateral film of abdomen. Note viscera outlined by massive pneumoperitoneum.

for proper diagnosis. This diffusely stippled intra-abdominal calcification is supposedly diagnostic of meconium peritonitis.⁶

Once the diagnosis of pneumoperitoneum is established, there is no need for further x-ray examinations, for example, contrast studies. The important thing at this juncture is to condition the patient for surgery as rapidly as possible. As a matter of fact, x-ray examination with contrast agents should be strictly avoided lest the material be extruded through the perforation.

Peptic ulcer is generally considered to be a disease of adulthood. However, in 1913, Holt⁷ reported 95 cases of duodenal ulcer during the first year of life. Most of the diagnosed cases in this age range only become evident after the onset of perforation or hemorrhage. The newborn gastric acidity is comparable to the adult but falls to low levels during the first ten days and rises very gradually, reaching the birth level at about three years. Some have postulated that the ulcer is secondary to an intracranial birth injury in line with the Cushing theory of an etiologic mechanism for certain peptic ulcers. Whatever the etiologic mechanism may be, there is almost universal opinion that when perforation occurs, the treatment should be prompt surgical closure of the perforation.

It is to be noted that in cases 4 and 5, the underlying cause of the perforation was a bowel obstruction distal to the site of the perforation. In most of the longer series, approximately 50 per cent of the cases were associated with a distal obstructive mechanism.⁸ Generally, the perforation is encountered closer to the obstructive site than those herein described. Numerous theories have been promulgated as an explanation for the spontaneous group, a few of these being obstetrical trauma, localized bowel wall defects, and localized inflammatory processes. To date, data have failed to prove these ideas.

No atretic segment was visualized in case 2, but the small bowel distal to the perforation was much smaller than the proximal component. Perhaps this was the result of defunctionalization produced by the outpouring of the gastrointestinal content through the perforation. This disparity in size plus the extensive degree of

local inflammatory reaction led us to treat this infant by means of a double-barrelled ileostomy as described by Gross.⁹ In case 3, the location of the defect was in approximately the same anatomic location as the previous case, but the paucity of local inflammatory reaction was indicative of a much more recent onset. This plus lack of disparity in size of the proximal and distal bowel segments was conducive to primary closure.

In case 4, the gastric perforation must have occurred during the two to three hours intervening between the last x-ray studies and the laparotomy, for it was readily evident on these films that there was no demonstrable pneumoperitoneum. Judging from the marked gastric distention (figure 4), if there had been a rent in the stomach at that time, gas would certainly have extruded through the defect. We surmised that the gastric defect had been produced by the tube which was inserted for relief of the gastric dilatation. The gastric wall of an infant must be extremely thin when associated with such a pronounced degree of acute distention and very susceptible to traumatic disruption. It is possible that the gastric perforation observed in case 5 may also have been secondary to a gastric intubation at some earlier date.

In his treatise dealing with neonatal surgery, Rickham¹⁰ reported a postoperative mortality rate of 25 per cent in 1952 as compared with 26 per cent in 1949 for comparable major surgical cases. The general perfection of neonatal anesthetic technics plus improvement in the details of pre- and postoperative management pursued in most hospitals where major surgery is being performed almost guarantees that such improvement is not an isolated example. Comparison of the 4 survivors reported herein with antecedent reports² emphasizes this point and its corollary, namely, the need for prompt diagnosis of this and the many other neonatal conditions potentially amenable to surgical correction.

SUMMARY

Five cases of gastrointestinal perforation in the newborn seen during the years 1954 to 1956 are presented. Four of the infants survived following surgical correction.

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Management of Spontaneous Pneumothorax

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ALTHOUGH MANY AUTHORS have documented the clinical picture, history, and follow-up statistics of spontaneous pneumothorax cases, few have proposed a plan for operative or surgical treatment. Traditional nonoperative management (watchful expectancy) for spontaneous pneumothorax is fairly well standardized, but we prefer active methods for the management of either the first, recurrent, or chronic case of spontaneous pneumothorax.

Fussell and Riesman¹ defined spontaneous, nontuberculous pneumothorax as "pneumothorax occurring suddenly in healthy individuals, without the cause being discoverable by physical examination or by the history of the case, and in which there is rarely formation of liquid."

Apparently Riolan, a contemporary of Harvey, first appreciated the condition, and in 1803, Itard coined the term pneumothorax in an exact description of the disease. The term spontaneous pneumothorax applies only to those cases in which a pleural defect permits air from the lung to enter the pleural space. Rupture of emphysematous blebs or bullae permits air to enter the pleural space, and the underlying disease of the pulmonary parenchyma may be either congenital or acquired. The incidence of spontaneous pneumothorax is higher in young men, and chest pain rather than dyspnea prompts the patient to seek medical care. Because the treatment of a patient with recurrent or chronic collapse of the lung differs from the management of the initial attack of spontaneous pneumothorax, these conditions will be discussed separately.

Simple spontaneous pneumothorax (initial episode). Treatment varies with the degree of lung collapse, but ordinarily nonoperative management is utilized for simple, uncomplicated, spontaneous pneumothorax of 20 per cent or less. Treatment of 20 to 100 per cent lung collapse is handled best by operative measures. The advantages of prompt re-expansion of a collapsed lung are prompt relief of symptoms; avoidance of complications, such as chronic pneumothorax, fibrothorax, and empyema; shortened period of

hospitalization; and earlier return to economic productivity.

With nonoperative therapy, how long does it take a collapsed lung to re-expand? In a study of 16 cases treated with bed rest, Kircher and Swartzel² found the average rate of air absorption per day to be 1.25 per cent (subject to daily variances). Many reports have documented that three to eight weeks may be required for complete re-expansion, and it should be realized that occasional cases show persistent pneumothorax.

Why have physicians been reticent to utilize operative measures even in patients with a massive pneumothorax? First, it should be granted that results of conservative therapy have usually been good, although chronic pneumothorax, bronchopleural fistula, fibrothorax, empyema, and deaths from unrecognized tension pneumothorax have occurred. We believe the thesis that aspiration of air and re-establishment of negative intrapleural pressure may keep the pleural vent open is unsound. In fact, this anachronistic thesis becomes untenable in light of contemporary thoracic surgical principles which have been repeatedly confirmed, namely, that a lung with an air leak seals most promptly when the lung is completely re-expanded. Thousands of pulmonary resections utilizing postoperative chest catheter drainage serve as vigorous testimony in support of prompt re-expansion of the lung for control of air leaks from the residual lung parenchyma. Consequently, we feel the objective in the treatment of a patient with a partially or totally collapsed lung is early, complete re-expansion, for then the visceral pleural vent will seal itself against the adjacent parietal pleura. Some authors have warned that operative intervention may result in infection, serous effusion, and/or hemorrhage. However, the advantages of active treatment for significant pneumothorax cited earlier seem to offset its potential disadvantages. Furthermore, with proper caution, theoretic complications from operative management approach zero.

Operative management of the first collapse episode should consist of repeated needle aspirations or closed intrapleural drainage with either a small polyethylene tube or a chest catheter. Repeated needle aspirations have been largely

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Fig. 1. Chest film showing more than 50 per cent pneumothorax on right side.

abandoned in many institutions in favor of the continuous intrapleural suction cited previously. The following technic for insertion of a polyethylene tube or chest catheter has been used. A small area in the second interspace is infiltrated anteriorly with 1 per cent procaine, and a needle is inserted into the pleural space. Polyethylene tubing is then inserted into the pleural space via the needle lumen, and the needle is withdrawn. The polyethylene tube is then attached to a source of continuous suction, that is, 10 to 15 cm. of water negative pressure. An indwelling polyethylene tube is less likely to become dislodged or to tear the lung than is an indwelling rigid needle. If the air leak cannot be controlled through the polyethylene tube, the tube can be withdrawn and a chest catheter inserted with a chest trocar. Almost routinely, closed thoracotomy (with either a polyethylene tube or chest catheter) results in prompt re-expansion of the lung within a few minutes rather than the days, weeks, or months required under the expectant regimen. Once re-expansion of the lung is complete, those complications of fibrothorax, persistent bronchopleural fistula, and/or empyema are inevitably avoided.

Figure 1 is a chest film of an elderly dyspneic male with greater than 50 per cent pneumothorax on the right side. His symptoms and his chest film remained unchanged for several days

until drainage was instituted. Figure 2 shows his chest film a few hours after the insertion of a chest catheter through the second anterior interspace. The terminology of conservative versus operative management of spontaneous pneumothorax seems ill-advised, since conservative treatment for spontaneous tension pneumothorax is operative, whereas nonoperative management is scarcely conservative of the patient's comfort, convenience, finances, or predisposition to serious complications.

Recurrent or chronic pneumothorax. Operative treatment is indicated for either recurrent or chronic pneumothorax. The incidence of recurrent lung collapse on either the same or opposite side of the initial attack has been reported to vary from 5 to 30 per cent. Various types of operative procedures which have been tested in different clinics include: (1) "blind" introduction of irritant substances, such as hypertonic glucose, talc, Lipiodol, mineral oil, silver nitrate, and blood, into the pleural cavity in an attempt to produce a sterile inflammatory process resulting in pleural symphysis; (2) thoracoscopy with the direct application of 20 per cent silver nitrate to the lung surface in order to produce adhesions;³ (3) open thoracotomy with unroofing



Fig. 2. Same patient as seen in figure 1 a few hours after insertion of a chest catheter through the second interspace.

or excision of cystic blebs or bullae and the introduction of chemical or mechanical irritation to lung surfaces; and (4) open thoracotomy with unroofing or excision of cysts, blebs, or bullae plus a parietal pleurectomy. For several years we have used the latter method of management for most cases of chronic or recurrent pneumothorax. It does not produce the same febrile and systemic responses which follow iatrogenic pleuritis, and it allows the surgeon to observe directly and to correct underlying lung pathology. Furthermore, once the endothelial lining (parietal pleura) has been excised from one of the glistening surfaces, the other (visceral pleura) can no longer glide over it and, thus, becomes adherent to the adjacent endothoracic surface.

The involved hemithorax is entered through the fifth rib. Bullae and blebs are preferably unroofed or excised, if necessary, and then a parietal pleurectomy is done. The parietal pleura strips away easily from the chest wall (figure 3), and the mediastinal and diaphragmatic surfaces are preserved virtually intact. Any peel which traps the collapsed lung is excised and, subsequently, when the anesthesiologist administers positive pressure via the endotracheal tube, the lung expands. Efforts on the part of the surgeon and the anesthesiologist must be continued until the lung fills its pleural space; for, if a lung cannot be fully re-expanded at the time of open thoracotomy, it is unlikely that any additional significant re-expansion will occur postoperatively. Following this procedure, there will be varying amounts of hemorrhagic oozing from the raw chest wall as well as small air leaks from the underlying lung. Ligation of the macroscopic points of bleeding and air leaks should be performed painstakingly, and the use of a Cushing forceps to touch-coagulate these oozing areas saves time and blood. Residual seepage of air



Fig. 3. Parietal pleura being stripped from chest wall.

and/or blood are readily handled by maintaining complete re-expansion of the lung in the postoperative period. Three chest catheters are positioned in the pleural space—anteriorly as high as the apex, posteriorly along the paravertebral gutter, and inferiorly just above the diaphragmatic surface—and these are attached to suction in the operating room and maintained on constant suction (15 cm. of water) for two to three days postoperatively or until air leaks cease.

Our experience to date with parietal pleurectomy confirms the satisfaction which others⁴ who have used this technic have expressed. We have had no early or late recurrences or complications following this method, and we feel that on both practical and theoretic considerations it meets the requirements for a sound anatomic and physiologic procedure.

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Surgical Correction of Pure Mitral Insufficiency by Annuloplasty Under Direct Vision

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IN RECENT YEARS, effective surgical measures for treating stenotic lesions of the pulmonary, mitral, and aortic valves by valvotomy have been described.¹⁻⁵ The surgical operations originally described for these stenotic valvular lesions have been carried out by blind approaches to these defective valves and were all performed without interruption of the circulation.

The development and introduction into routine clinical use of safe and effective methods for working inside of the human heart under direct vision by use of extracorporeal circulation has removed the barrier to progress in the field of cardiac surgery and has resulted in a new era in the treatment of cardiovascular lesions. By 1955, the rapidly increasing experience with the use of our pump-oxygenator^{6,7} for congenital cardiac malformations had resulted in confidence concerning the well-being of the patient during an interval of cardiopulmonary bypass. It was predictable at that time that the open operation in which the surgeon sees precisely what the pathologic abnormality looks like and then proceeds to correct it under direct vision would be extended to these stenotic valvular lesions heretofore customarily treated by blind or closed technics. This transition has occurred at the University Hospitals, and the open operation has become the surgical procedure of choice for virtually all patients deemed in need of operative help. The accuracy and scope that direct vision allows has inevitably improved the results of surgical treatment of these conditions.^{8,9} Moreover, the more critically ill the patient has

been before surgical therapy, the greater have been the benefits of open cardiotomy when the results have been compared with those obtainable previously with the closed methods.

Physicians and cardiologists have been in agreement that, as a group, regurgitant defects of the aortic or mitral valves are less well tolerated by man than are stenotic defects. Thus, effective methods for the surgical correction of pure insufficiency of these valves have been clearly needed, and a number of surgical approaches for the control of valvular regurgitation have been offered in the past few years. Although diverse in their theory and approach to the solution of this problem, all of these operative methods have had in common the fact that they have been carried out by closed or blind methods, and none has found general acceptance.

We began animal research upon these problems several years ago, and our reports are detailed elsewhere.^{10,11} This experimental work has proved extremely valuable as a source of basic information about the principles of valvular surgery. The successes subsequently achieved in the patients would not have been possible without this preliminary knowledge. Yet, as might be surmised, work with normal canine valves left unsettled a number of problems that could only be resolved by in vivo observations upon diseased human valves. Moreover, a working knowledge concerning the function of normal heart valves has been difficult to obtain. Even the study of fresh autopsy specimens has been of relatively little value here, since the dynamic contribution of the myocardial tone to valvular function is lacking. Thus, it is gratifying to report that some substantial progress has been made in the treatment of insufficiency of these valves by utilizing the benefits of direct vision during total cardiopulmonary bypass with the heart beating. Our experiences with aortic insufficiency are detailed elsewhere.¹²

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Fig. 1. Correction of mitral regurgitation. Operative technic for selective suture of the annulus fibrosus under direct vision utilizing total cardiopulmonary bypass.

It is the purpose of this report to describe a corrective operative method for treating mitral regurgitation—annuloplasty. In each patient, this procedure has been carried out under direct vision utilizing the pump-oxygenator. Although the series is still small, so incapacitated were these patients preoperatively and so dramatic has been their postoperative improvement (together with the fact that the operative and late mortality has been nil) that we consider the method worthy of description at this time. Moreover, the follow-up period upon the first patient so operated now exceeds one year's time. At this point, we would emphasize that the surgical treatment of valvular heart disease, either stenotic or regurgitant, will not be completely satisfactory until the surgeon has at his disposal, when needed, a satisfactory prosthetic valve to replace the one totally destroyed by the disease process. However, whereas we formerly were

of the opinion that prosthetic replacement might be necessary particularly for most patients with valvular insufficiency, as our clinical experience has increased, it seems likely that this ultimate approach might be necessary relatively infrequently.

SURGICAL TECHNIC

Access to the chest has been obtained in all cases by means of a standard right thoracotomy incision through the bed of the fifth rib with the patient in a lateral position (figure 1a).

Total cardiopulmonary bypass is obtained by cannulization of the superior and inferior cava. The arterial blood was returned from the pump-oxygenator through an arterial catheter placed either in the femoral or right subclavian artery. Right atrium was cannulated to collect the coronary sinus drainage. The body temperature was kept normal in all of these patients to avoid the

TABLE 1
PATIENTS WITH MITRAL INSUFFICIENCY HAVING DIRECT VISION SURGERY BY ANNULOPLASTY

Patient	Past history	Preoperative status	Operative findings	Operative procedure	Duration of bypass	Left atrial pressure, mm. Hg Pre-Post-	Postoperative follow-up
Case 1 Male 14 yr.	Murmur noted at 9 mo., coarctation resected at 11 yr. Mitral insufficiency noted at operation. Atrial fibrillation from age 12, with progressive cardiac deterioration.	Atrial fibrillation, Am. Heart class IV E, grade IV systolic murmur and thrill at apex, liver down 4 cm. Confined to bed with intractable right and left heart decompensation.	8/29/56, giant left atrium, valve leaflets appeared normal. Severe insufficiency posteriorly.	5 No. 2 silk mattress sutures placed in annulus at posterior commissure and tied over Ivalon. Sutures completely obliterated regurgitant jet. No thrill in left atrium.	23½ minutes	43/26 18/10	Grade II systolic murmur, doing very well 14 mo. postoperatively. Goes to school now.
Case 2 Male 43 yr.	Atrial fibrillation noted on '48 EKG. No history of rheumatic disease. Had progressive failure since 1948. Poorly controlled on digitoxin. Had not worked for 7 yr. Laparotomy for mesenteric embolism 3 yr. before surgery. Cerebral embolism with hemiparesis 6 mo. before surgery.	Atrial fibrillation, Am. Heart class IV D, grade III systolic murmur at base and grade III diastolic murmur at apex. Residual right hemiparesis.	12/28/56, giant left atrium, heavily calcified valve with stenosis anteriorly and regurgitation posteriorly, 3 cm. opening present in posterior commissure.	Anterior commissure incised 3 cm. and posterior commissure incised 1 cm. 2 No. 2 mattress silk stitches tied over Ivalon in posterior commissure. No atrial or ventricular thrill felt postoperatively.	25½ minutes	48/20 30/20	Has returned to full time work as x-ray technician. Regular diet, takes digitalis to control rate.
Case 3 Female 19 yr.	Rheumatic disease at 14 yr., with heart failure necessitating digitoxin to present time. Multiple hospitalizations for pulmonary infarcts and/or chronic decompensation.	Atrial fibrillation, Am. Heart class IV E, grade IV systolic murmur at apex. Systolic thrill at apex. No diastolic murmur.	8/16/57, giant left atrium, annulus enlarged, valve leaflets essentially normal, although thickened. Marked insufficiency in posterior commissure. Slight insufficiency in anterior commissure. No calcification.	2 No. 2 silk mattress sutures each tied over Ivalon in posterior commissure, 1 silk mattress suture placed in anterior commissure. Valve completely competent after tying stitches.	29 minutes	30/15 20/12	Grade I systolic murmur and no thrill postoperatively. Follow-up short but doing very well on regular diet without salt restriction.
Case 4 Male 39 yr.	Rheumatic heart disease at 19 yr., with murmur noted at 21 yr. Heart failure developed 1 yr. preoperatively. Well compensated on digitoxin but unable to work as a farmer.	Atrial fibrillation, Am. Heart class III D, grade III Systolic murmur at apex. Grade II diastolic murmur at apex.	8/28/57, giant left atrium, mitral valve was stenotic and regurgitant, latter being predominant.	Anterior commissure incised 1 cm., 2 No. 2 silk sutures were tied over Ivalon in posterior commissure.	22½ minutes	50/20 17/5	Grade I systolic murmur postoperatively. Follow-up short but doing very well. Off digitalis and on a regular diet without salt restriction.

cardiac depression associated with hypothermia.

The flow rate for each patient has been regulated during the bypass by monitoring the electroencephalogram and the systemic blood pressure. Generally, a flow rate of 50 to 75 cc. per kilogram of body weight has kept these functions in a normal range.

Exposure of the mitral valves has been through a left atriotomy. All patients had a giant left atrium and exposure of the valve was excellent. The heart was not arrested, inasmuch as its continuing function has been extremely helpful in judging when competency of the valves has been restored.

In all patients, only a portion of the valve was incompetent and mattress stitches of heavy silk were placed in the annulus fibrosus of this incompetent portion and tied over pillows of compressed polyvinyl sponge (Ivalon) (figure 1*b* and *c*). The function of the Ivalon is twofold: to obviate any possibility of the stitches cutting out of the annulus, and to give added support to the leaflets and annulus itself. Once competency of the mitral valve has been restored, the usual precautions against retained air in the left ventricle are necessary (figure 1*d*).

REPORT OF CASES

Since August 29, 1956, 4 patients have had this operative procedure performed under direct vision utilizing the helix reservoir pump-oxygenator. Each of these patients was seriously ill preoperatively and 2 of them (cases 1 and 3) were considered to be in the terminal stages of

their disease by their families and cardiologists as well. There has been no operative or late mortality in these cases. The first 2 patients, briefly reported previously,¹²⁻¹⁴ have been followed long enough now to indicate that their initial improvement has been sustained and has, in fact, continued to progress favorably. This latter observation suggests that as the left ventricle has decreased in size, the competency of their mitral leaflet tissue has been further augmented by shrinkage of the annulus. Other details concerning these patients are summarized in the table.

SUMMARY AND CONCLUSION

A new operative approach for the correction of mitral insufficiency, consisting of selective direct vision suturing of the annulus fibrosus, termed annuloplasty, has been described. The surgical approach to the mitral valve has been obtained through a right thoracotomy and left atriotomy during an interval of total cardiopulmonary bypass utilizing the pump-oxygenator.

Four patients, all seriously incapacitated preoperatively by advanced degrees of mitral regurgitation, have been treated by this operation. All are alive and dramatically improved postoperatively. The first patient operated upon has now been observed for fourteen months.

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Grants can be used for either clinical or experimental research. The funds can be used as the sole source of support for exploratory or small-scale studies. The funds can be used in conjunction with college or other funds to support sections of a large-scale research project.

Grant recipients will be selected annually by the Com-

mittee on Research of the American College Health Association. Member colleges are invited to submit research proposals (6 copies) at any time. The copies should be prepared so that they indicate the size of the college but not its name. Recipients will be announced at the annual meeting of the association based on all proposals received by February 1 of that year. Recipients will be selected according to the merits of the research design and the apparent value of the project to the field of student medicine.

Proposals can be mailed to Douglass S. Thompson, M.D., Chairman, Committee on Research, New York University, New York 3, New York.

The period of agreement between the Continental Casualty Company and the American College Health Association for these grants is for three years beginning May 15, 1956. Convention, professional, and public reports on grant research should mention the Continental Casualty Company.

Practical Diagnosis and Treatment of Liver Disease, by CARROLL MOTON LEEVY, M.D., 1957. New York: Paul B. Hoeber, Inc. 336 pages. \$8.50.

For many of his conclusions on the diagnosis and treatment of patients with liver disease, Dr. Leevy is able to rely upon his rich personal clinical experience at the Jersey City Medical Center. The results of observations on 1,000 consecutive patients with various hepatic disorders, documented in many of the author's earlier publications, have been drawn together in a concise, clearly written monograph. The book is intended as a guide to practicing physicians and as such it can be recommended.

The management of the patient with liver disease due to nutritional deficiencies, as most commonly seen in the alcoholic, is handled in a thorough and skillful manner. Two-thirds of the patients in the large series studied by the author fell into this category. Diagnostic approaches to this problem are clearly outlined. The writer and his associates utilize needle biopsy of the liver extensively. The technics and necessary precautions for this procedure are well described. Current methods available for the control of gastrointestinal bleeding in patients with cirrhosis are presented very clearly. The physician faced with the vexing problem of ascites formation and fluid retention or with impending coma in patients with cirrhosis will appreciate the guidance found in the section dealing with those subjects.



The student in search of detailed information will not find an extensive review of all phases of hepatic disease in this monograph. Although uncommon disorders are briefly mentioned, major emphasis is placed on the problems of diagnosis and treatment of the more common forms of liver disease.

F. W. HOFFBAUER, M.D.

Clinical Roentgenology, by ALFRED A. DE LORIMIER, M.D., HENRY G. MOEHRING, M.D., and JOHN R. HANNAN, M.D., 1956. Springfield, Illinois: Charles C Thomas, 764 pages. \$24.50.

The authors have written a volume covering a vast field: namely, the digestive tract, gallbladder, liver, pancreas, excretory tract and obstetric roentgenology. They cover well the common radiologic problems without attempting to make the volume a complete reference book. The clinical highlights and some of the important laboratory findings are presented with each entity as is a brief differential diagnosis. Many of the more involved radiologic pro-

cedures are briefly touched upon. The bibliography is good, and, with few exceptions, the reproductions are excellent.

The volume will be of value to physicians concerning the technics, interpretations, and pitfalls that are encountered in the more frequent radiologic problems.

DAVID J. ROSENBLUM, M.D.

The Pathogenesis of Coronary Occlusion, by A. D. MORGAN, M.D., with a foreword by JOHN B. DUGUID, M.D., 1957. Springfield, Illinois: Charles C Thomas. \$8.50.

In the day of the rising incidence of coronary disease and emphasis of the biochemical approach, the author has brought the problem back to earth by emphasizing the morphology of coronary occlusion. For this study of the pathogenesis of coronary occlusion, the contents of the book are divided into two main parts; one, a quite complete historic review; and the other, a study of the morphology of coronary occlusion. There are excellent illustrations and the chapters are concise. The conclusions, covering a few pages, should be read by all interested physicians. The author supports the thrombogenic concept of atherosclerosis but does not deny the importance of other factors. Cholesterol in plaques may be derived from lipid infiltration of the intima in the early stages, or to the breakdown of red-blood cells after mural thrombosis or capillary hem-

(Continued on page 34A)



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BOOK REVIEW

(Continued from page 450)

orrhage. What is common to the lipid infiltrate and the disintegrating hemic elements is the insoluble nature of cholesterol. The author feels that the evidence suggests we may be wrong in considering the atherosclerosis as a specific disease rather than the nonspecific reaction by the artery wall to a variety of noxious stimuli. It is stated that all the evidence collected in the second part of this work goes to show that coronary occlusion, as distinct from lesser degrees of coronary atherosclerosis, is the result of old or recent thrombosis. Duguid's suggestion is quoted that occlusive atherosclerotic plaques are largely composed of resolving thrombi.

The problem of coronary occlusion is different from the end result of senile atherosclerosis. Deaths have increased markedly, and the severity of arterial change is out of proportion to that in vessels of similar calibre. The author believes that it would be well to extend the search to the localizing factors that predispose to thrombosis in the coronary arteries themselves.

C. A. MCKINLAY, M.D.

Schizophrenia: Somatic Aspects, edited by DEREK RICHTER, 1957. New York: The Macmillan Co. \$7.00.

This excellent summary of present-day knowledge in regard to schizophrenia is written by a group of forward looking and able British psychiatrists. Even a discussion of the heredity of the disease is included. Also discussed is the newer knowledge concerning the affect of certain drugs in producing psychoses. The pathology of the disease is described. This is a must book for the shelves of a scientific psychiatrist.

WALTER C. ALVAREZ, M.D.

The Physiology and Biochemistry of Lactation, by S. J. FOLLEY, D.Sc., Ph.D., F.R.S., 1956. Springfield, Illinois: Charles C Thomas, 153 pages. \$4.50.

This is the first English edition of this monograph, which initially appeared in French in 1954. In it, the author describes in objective and quantitative terms the phenomenon of lactation using the experimental work done on domestic and experimental animals, much of it

contributed by his own group. He discusses succinctly initiation and perpetuation of lactation, correlates developmental influences with specific breast tissue changes, and describes the basic relationships of milk lipid, lactose, and protein synthesis. Of particular interest are those sections which describe the role of the adrenal cortex in lactation, and the more recent information which bears on stimulation and inhibition of lactation by ovarian hormones and the related pituitary factors. The author's style is lucid throughout, and his arguments are firmly based on experimental observation.

This volume is principally directed to the physiologist and the biochemist. That there are matters directly applicable to veterinary medicine, dairying, and animal husbandry is quite clear. The medical practitioner will quickly realize that he is confronted with the uncertainty of projecting the information contained to the human species. Nevertheless, it affords him a basic review of the physiology of this most remarkable and little-investigated biologic function.

T. H. KIRSCHBAUM, M.D.

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Elbow Fractures in Children

HARVEY O'PHELAN, M.D.

Minneapolis, Minnesota

MUCH HAS BEEN WRITTEN during the past years emphasizing a conservative approach in the treatment of fractures in children. It is well understood that the majority of these injuries are easily and most satisfactorily handled by the simpler means of treatment. These include manipulation and plaster cast, skin, and, in some instances, skeletal traction. In spite of these procedures, however, trauma at the elbow joint remains an enigma for the average practicing physician.

The structure of this articulation with its complex ginglymo-trochoid functional anatomy, its obliquity to allow for the carrying angle, the various developing apophyses and epiphyses, the irregular appearance of these structures as they become radiographically evident, and the unknown factors regarding the ratio of longitudinal growth at the elbow joint all contribute to some extent to the difficulty in handling these injuries properly.

Vahlquist¹ reported that his observations tend to confirm a hypothesis that about three-fourths of the growth in the upper extremity takes place at the epiphyseal lines away from the elbow joint, that is, from the proximal humeral and the distal radial-ulnar epiphyses. This establishes a longitudinal growth differential between the superior and inferior epiphyses of the bones that make up this articulation. Confirmatory demonstration of this feature has been published by

other authors.^{2,11} As such, then, it seems logical to infer that fractures close to the growth line at the elbow do not have the same potential to correct themselves as do those injuries involving near-proximity to the superior humeral and the inferior radial-ulnar epiphyses.

In his outstanding treatise on this subject, Blount³ pointed out that angulation at a fracture site adjacent to the distal ends of the humerus has little dynamic corrective possibilities. He emphasizes that rotational deformities are permanent. It is apparent that deformity following a fracture near the elbow joint may be the end result of an unsatisfactory reduction of the fracture. It may, however, be due to injury at the epiphyseal line with resulting retarded growth in that region or, with some feasibility, due to an increased rate of growth at the lateral epicondylar epiphyses, secondary to stimulation resulting from the injury.

The anatomy at the elbow joint is recognized as having a highly complex structural pattern.⁴ Configuration of the joint surfaces is established from a functional stability standpoint to allow for a free range of motion with an essentially stable articulation. In reality, three separate joints make up this complicated unit which are necessities in order to comply with the range of motion, stability, and usefulness of the hand to which the elbow owes its anatomic pre-eminence. The proximal radial-ulnar portion of the elbow joint is a trochoid articulation. The ulnar trochlear subdivision is a type of ginglymus or hinge joint with some helical rotation toward the base of the

thumb. The radial capitellar portion is a true ginglymo-trochoid joint allowing flexion, extension, and full ranges of pronation and supination. Lateral and medial stability of the joint receives reinforcement from collateral ligamentous structures, while the anterior-posterior stability is dependent on the prominent coronoid and olecranon processes of the ulna and their attached soft tissues.

Fractures of the lateral humeral articulation should be divided into, as described by Henry Milch⁵ of New York City, a type I fracture involving mainly the capitellar fragments and a second type which includes the entire condylar structure and is characterized by lateral subluxation of the forearm.

The type I fracture may, at times, be treated conservatively by placing the elbow in flexion and retaining the structures in approximation with the aid of external plaster fixation.⁶ Usually, however, the capitellar fragment may rotate and angulate so that open reduction and fixation become necessary. The type II fracture always requires operative interference because of the lateral subluxation of the forearm with the fractured fragment. This latter fracture seems to cause the great amount of deformity and disability associated with injuries in the region of the elbow joint. An awareness of these two separate types of fractures is essential for proper treatment.

Injuries to the medial epicondyle are usually not as bothersome as those on the lateral side of the humerus. This structure, being an apophysis, does not enter into the longitudinal growth of the elbow joint. Fractures with displacement may frequently be reapproximated by closed reduction. The fragments can be held in satisfactory apposition in a plaster support with the elbow flexed. Any undue displacement or difficulty encountered in the reduction of these injuries should promote consideration of surgical replacement and fixation with Kirschner wires. Trauma affecting the entire medial condyle is rare. Skeletal fixation may be necessary.

Fractures involving the head of the radius in children, although not common, definitely have a serious potential for a deformed type of elbow articulation if they are not handled properly. The great majority of these injuries may be treated conservatively without residual disability. However, open reduction should be considered for any displacement beyond 45 degrees, particularly if seen as a fresh fracture and closed reduction has been unsuccessful. If necessary, fixation with a small wire through the capitellum into the reduced, fractured head and on through the in-

tramedullary substance of the distal radius is well tolerated. Under no circumstances should the head of the radius be removed as in an adult with similar displacement.

Fractures of the olecranon process are readily treated with the arm in full extension using plaster splint fixation. Should the fractured olecranon or proximal ulna be associated with a dislocation of the head of the radius, as is seen in the Monteggia type of fracture, it may be necessary to fix the ulna with small transfixion wires so that the elbow can be placed in flexion in order to keep the head of the radius from redislocating.

Supracondylar fractures of the elbow often are, along with the lateral condylar injuries, most difficult to treat primarily. If seen early, reduction with the elbow held in flexion is usually satisfactory. However, at times, angulation and rotation may be apparent and skin traction, as described by Dunlop,⁷ or the various types of skeletal traction may be necessary. It is generally recognized that occasionally a supracondylar fracture is encountered that simply does not respond to conservative measures.^{8,9} In these rare instances, it may be better to perform operative reduction and fixation than to do the best one can from a closed method and accept a certain amount of deformity, as has been advocated in other areas of orthopedic endeavor.¹⁰ During past years, we have seen a few fractures of this type which could not be reduced satisfactorily without leaving a rotational deformity. These were opened surgically, reapproximated, and fixed with small Kirschner wires. No untoward results have occurred from the surgery, and, as yet, no restriction of motion has been apparent. It must be amplified and repeated again and again that these cases are extremely rare and that the overwhelming majority of supracondylar fractures can be treated with conservative means.

Dislocations at the elbow, with or without fracture, require reduction as soon as possible. This injury frequently occurs with associated disruption of the medial epicondyle. The reduction is accomplished without difficulty and generally the medial epicondyle is stabilized with wires. Calcifications of the capsular structures and/or myositis ossificans that may occur as a complication are treated conservatively, and operative interference is unwise.

Intramedullary fixation of fractures in the lower humerus in children has its place in patients with athetoid types of cerebral palsy or, more rarely, when a head injury produces recurrent spasm of the upper extremity that tends to dislodge and perhaps compound the fracture fragments. Some slight overgrowth may be expected

in the extremity in which intramedullary fixation has been utilized.

These childhood fractures, as described, may take as long as six to eight weeks to heal properly. Usually, however, adequate bony union occurs at the end of four weeks to allow for active, guarded movement. Wires used to stabilize the fragments should be taken out in approximately three weeks except in the occasional patient in whom fixation has been utilized to prevent re-

dislocation of the head of the radius. After removal of the initial plaster casts, a sling will afford effective protection for an additional ten to fourteen days.

Physical therapy is usually unnecessary and any type of forced, passive, or resistive exercise must be emphatically condemned. Should growth discrepancy or structural deformity occur, various reconstructive procedures are successful after the growth of the extremity has terminated.

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IN HALLUX VALGUS with painful bunion formation, the basic defect is abduction of the great toe and spread of the first metatarsal head medially. The transverse metatarsal ligament stretches, and the heads of the second, third, and fourth metatarsal bones are forced to bear more weight. A bunion forms on the head of the first metatarsal as a result of pressure by the shoe; calluses develop on the second and third metatarsals; and hammertoe deformities of the second, third, and fourth toes, with painful corns on the tips of the toes ensue. Wearing of high-heeled, narrow-pointed shoes may initiate or aggravate the deformity.

If the disability is seen early, wearing of low-heeled shoes which have firm leather insteps, straight borders in the forefoot portion, and toecaps to prevent crowding may halt progression of the disease. If this does not relieve discomfort, surgery is advisable. Probably the best operation is removal of the proximal half of the first phalanx and tenotomy of the extensor hallucis longus tendon. The new bone on the first metatarsal head is also excised to leave a normal contour. Other deformities of the forefoot must be treated separately. Postoperatively, a transfixion pin through the pulp of the great toe with elastic traction to a wire frame immobilized by a plaster boot is used.

F. G. DAY, M.D., Edmonton, Alberta. *Canad. M. A. J.* 76:618-620, 1957.

Comparative Results of Surgery and Radiotherapy in Carcinoma of the Cervix

J. A. DEL REGATO, M.D.

Colorado Springs, Colorado

CANCER OF THE CERVIX is the most curable of all major forms of cancer affecting the human body. Through the first half of the century, slowly but persistently, earlier diagnosis and more adequate irradiation have succeeded in improving the over-all results. It is now a fact that in competent centers with an average distribution of early and advanced cases but with maximum skill applied to the radiation treatment of all, a five-year survival rate of nearly 50 per cent is a possible goal. Much of the slow progress made by radiotherapy in the past twenty-five years has been in the domain of radiobiology, in the utilization of new forms of external irradiation, in better practical dosimetry, and in the understanding of clinical radiotherapy. These developments have taken place away from the operating theater and have left the amateur or part-time radiotherapist somewhat out of pace with radiotherapy. In spite of the relatively good results of radiotherapy, new possibilities must be investigated; yet, we must not run away with our emotional hopes. In the treatment of malignant tumors, we can only be biased on behalf of the patient, and we cannot impose on the patient our own limitations.

The considerable progress in anesthesiology, the development and use of antibiotics, and the improvement in the pre- and postoperative care of patients, which we have witnessed in the last twelve years, has resulted in unquestionable and pronounced reduction in operative mortality. This alone justified a renewed trial of surgical treatment of some hitherto inoperable forms of cancer. In the case of carcinoma of the cervix, the rebirth of surgical enthusiasm applied itself to the treatment of (1) early cases and (2) advanced lesions.

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Paper presented at the eighth International Congress of Radiology, Mexico City, July 1956.

1. The treatment of selected early lesions has consisted primarily of the extension of hysterectomy to include removal of some pelvic nodes. The hope was that such an approach would prove that selected early lesions could be cured in greater proportions than previously attained, without operative mortality, thus justifying surgical treatment for at least these selected few in order to raise the over-all results of this group. From the point of view of cancer surgery, the hysterectomy plus lymphadenectomy has proved to be rather an inadequate operation, incapable of making a clean removal of all potentially invaded lymph nodes and, also, dangerously inadequate as soon as the lesion proves to have extended beyond the immediate cervical area.

2. The surgical approach to the treatment of advanced lesions assumed the possibility of improved results through additional mutilation, implying both greater risk and, unquestionably, morbidity. Removal of the bladder or rectum or both in continuity with the uterus and the cancer-bearing tissues and nodes is logical in cancer surgery. But, its application to the treatment of advanced cases is, of necessity, selective from the point of view of the general condition and of the extent of the disease.

It is now left for us to scrutinize the results in order to see (1) whether or not the negligible operative mortality justifies the surgical treatment of selected early lesions, and (2) whether or not the operative mortality, mutilation, and morbidity of pelvic eviscerations may prove justified by better results. Advocates of surgical treatment often compare their results with their own radiotherapeutic experience or with the results of radium treatment alone. Instead, their results should be compared with those of radiotherapy, external and internal, applied at its best. It is often forgotten that radiotherapy also has undergone progress. External pelvic irradiation (figures 1, 2, and 3) has been progressively used to greater advantage with definite improvement of permanent results in the treatment of the relatively advanced group. The possibilities of

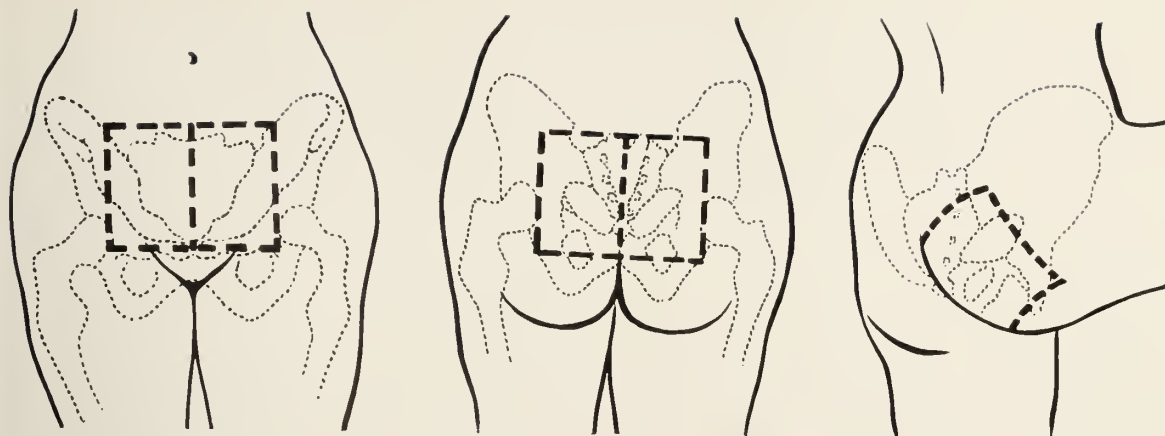


Fig. 1 (left). Anterior portals utilized in external irradiation. Fig. 2 (center). Posterior portals utilized in external irradiation. Fig. 3 (right). Ischiorectal portals were also utilized in the external irradiation of this series of cases.

transvaginal roentgen therapy have been exploited to certain advantage; new radium and cobalt applicators and more uniform dosimetry have been introduced in the armamentarium of the therapeutic radiologist.

Doctor J. V. Meigs, of Boston, has dedicated himself to a selection of early cases of carcinoma in which the results of surgery may show at its best. His cured cases include many who received preoperative irradiation and, of these, some showed no cancer on the surgical specimen. Results of these cases should be credited to a combined effort of both forms of treatment rather than to surgery alone. If we attributed these results to the surgical treatment, we cannot disregard the selective character of the series and must remain interested in the over-all results for the stages I and II, including the non-operated cases. Doctor Meigs's purpose was to evaluate the maximum possibilities of surgery in a highly selected group of patients. Accepting this, we should ascertain whether or not operating in a few and irradiating the others affects the over-all results of a given series of cases. The over-all results at the Massachusetts General Hospital for a corresponding period of time are much below the results for the operated few (table 1). Moreover, the over-all results for these early stages at Massachusetts General

Hospital is under average for several such institutions and well below results obtained in some radiotherapeutic institutions (tables 2 and 3).

Doctor A. Brunshwig of New York has applied himself to the development of varieties of pelvic exenteration. Admittedly, the operation implies a choice of suitable patients; about one-third of all patients operated upon are not resected and do not appear in the statistics of results. The operative mortality in the hands of Doctor Brunshwig was 25 per cent in a series of exenterations. Of these operated cases, only 8 patients were living at the end of five years (13 per cent), 4 were stage III, 2 were stage IV, and 2 were postirradiation recurrences (table 4). These remarkably poor results could only be justified if there was no other form of treatment capable of yielding as good results. But radiotherapy administered to a larger and less favorable group has shown its ability to cure a greater proportion of patients without such high mortality; the benefited patients live without the imposition of surgical mutilation. We feel that the pelvic evisceration remains useful only in the treatment of postirradiation recurrences following adequate or inadequate radiotherapy. In fact, the proportion of successful results is greater in this group, and the indication is well justified if no other recourse is available.

TABLE 1
SURGERY FOR CANCER OF THE CERVIX

	Stage I Well 5 years or more			Stage II Well 5 years or more		
	Treated	Ratio		Treated	Ratio	
J. V. Meigs, M.D. (1945-1950)	84	68	81%	46	27	59%
Massachusetts General Hospital (1944-1948)	136	85	62%	163	73	45%

TABLE 2
CARCINOMA OF THE CERVIX
RESULTS OF TREATMENT IN 84 INSTITUTIONS
IN 20 COUNTRIES
(1944-1948)

	Stage I		
	Cases	Well 5 years or more	Rate
All institutions (Heyman)	6,660	4,324	65%
Massachusetts General Hospital (Meigs)	136	85	62%
University of California (San Francisco)	99	69	70%
Radiumhemmet (Stockholm)	242	178	74%
Radium Institute (Paris)	197	141	77%
Charity Hospital (New Orleans)	101	80	79%

TABLE 3
CARCINOMA OF THE CERVIX
RESULTS OF RADIOTHERAPY IN 84 INSTITUTIONS
AND 20 COUNTRIES
(1944-1948)

	Stage II		
	Cases	Well 5 years or more	Rate
All institutions (Heyman)	13,294	6,109	46%
Massachusetts General Hospital (Meigs)	163	73	45%
Radium station (Copenhagen)	445	225	51%
Marie Curie Hospital (London)	124	65	52%
Charity Hospital (New Orleans)	183	99	54%
Institute Roussy (Paris)	216	119	55%

For a long time we have worked on the premise that what is needed in radiotherapy of cancer of the cervix is an effort toward "homogenizing" the dose received by every point of the potential area of tumor involvement within the pelvis. Logically, success cannot be expected by overdosing at one point and underdosing at another. When radium is used with average technics, the nearest area of the anterior lip of the cervix may receive over 20,000 r. in three to four days, whereas even when external irradiation is added with average technics, the total dose received by certain areas of the tumor in the periphery of the pelvis may be of the order of a few hundred roentgens in several weeks. We decided to experiment with trans-

TABLE 4
EXENTERATION FOR CANCER OF THE CERVIX
MEMORIAL HOSPITAL, NEW YORK
ALEXANDER BRUNSCHWIG, M.D., JANUARY 1955

	Cases	Well	Rate
Stage III	28	4	17%
Stage IV	15	2	11%
	43	6	14%

vaginal roentgen therapy (figure 4). Unhampered by fear of overirradiating the midline, we have aimed to irradiate as much as possible from the outside and to raise the minimum dosage at any point of the potential tumor area (figure 5).

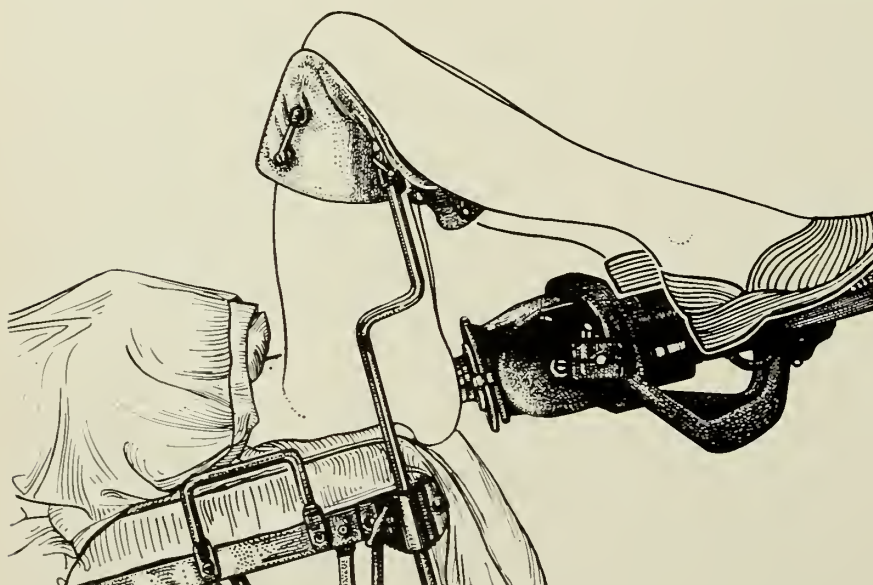


Fig. 4. Position of patient and equipment for trans-vaginal roentgen therapy.

TABLE 5
CARCINOMA OF THE CERVIX
EXTERNAL ROENTGEN THERAPY PLUS TRANSVAGINAL ROENTGEN THERAPY
1943-1947

	Number of patients	Died of intercurrent diseases before 5 years	Died of cancer	Lost to view	Well 5 years or more	5-year survival rate
Stage III	59 ¹	5	32	0	22	32%
Stage IV	58 ²	1	41	1	9	15%
Total	117	6	73	1	31	26%

¹Three patients had external irradiation only.

²Included: 3 patients who had no treatment, 2 who died during the course of treatment, 1 who abandoned treatments, and 8 who had external irradiation only, all of whom expired.

In a series of 117 consecutive nonselected patients in stages III and IV treated by the author with a combination of external pelvic and transvaginal roentgen therapy, the over-all five-year survival for stage III was 32 per cent and for stage IV 15 per cent (table 5). This series of patients received external irradiation with 250 kv. to a maximum of dosage possibilities. The transvaginal roentgen therapy was done with 110 kv. only to supplement the external irradiation. This clinical experiment proved that the combination yields better than average results in the treatment of relatively advanced lesions.

On the basis of an analysis of the results of the most skillful advocates and practitioners of surgery in the United States and a comparison with the results of radiotherapy, we submit that the evidence at hand does not justify surgery in early or advanced cases of carcinoma of the cervix except in exceptional circumstances.

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SECTION B TRANSVERSE SECTION OF THE PELVIS AT THE LEVEL OF THE CERVIX

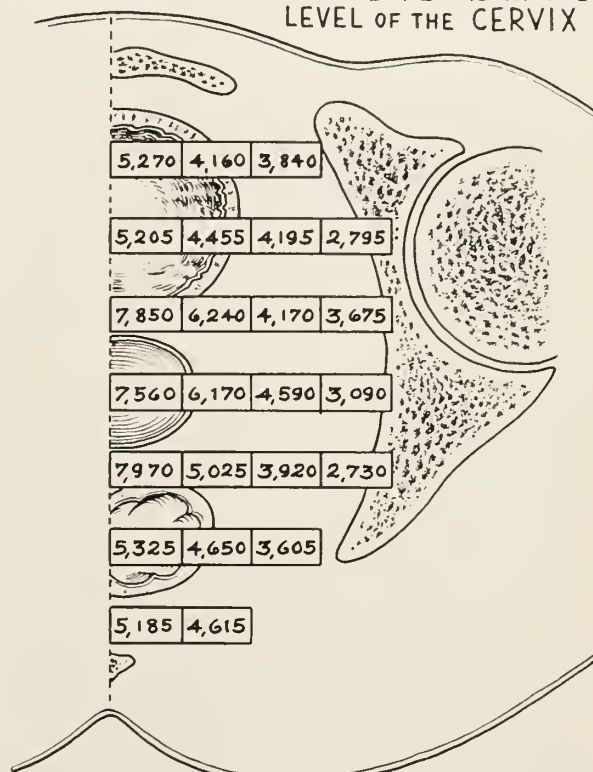


Fig. 5. Computation of dosage from different portals of entry including transvaginal irradiation. Total dose administered in about ten weeks.

The Management of Third-Degree Burns

PAUL R. LIPSCOMB, M.D.

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IN SPITE OF THE ESTIMATE that 90 per cent of all burns are preventable, most physicians engaged in the practice of medicine and surgery are occasionally called upon to administer aid to the severely burned patient. In view of the possibility of some local or national disaster, it behooves all physicians to know the fundamentals in the care of burns. As Moyer¹ has emphasized, the mortality rate attending severe burns covering up to 25 per cent of the body is not appreciably lower today than it was thirty years ago and the same is true for burns covering more than 75 per cent of the body surface. In the former group, the therapeutic problems could be met effectively without particular attention to the principles of fluid balance, antibiotic therapy, and special nutritional care. The primary requisites for the treatment of relatively small burns are alleviation of pain, aseptic handling of the wound, prevention of contractures (this applies especially to the hands), and early skin grafting.

The mortality rate associated with burns of more than 75 per cent of the body's surface has not changed since the beginning of time, because such burns have been and still are almost always fatal. This is so because we are still incapable of mastering the enormity of the problems posed by such injuries. Although these patients no longer die during the first day or two from shock, they still die from subsequent complications.

The prognosis in burns is partly dependent on the age of the patient. Children with extensive burns, if adequately treated, are more apt to survive than are adults over fifty years of age with involvement of the same percentage of the body surface. Coventry and Logan² stated, "Apparently, the ability to withstand the severe trauma of an extensive burn is inversely proportional to the age."

This discussion is particularly concerned with the patient who has 25 to 75 per cent of his body

surface burned, since medical science has made great advances in the treatment of burns falling in this category. It is obvious that if less than 25 per cent of the body surface is involved, the overzealous parenteral administration of fluids might create a serious problem which otherwise would not arise.

"Third degree" or "full thickness" designates those burns in which the skin and all epithelial elements are destroyed. Epithelization can start only from the periphery or from grafts after the slough has been eliminated. Such burns present at first a blanched or charred appearance. Blebs do not form on third-degree burns. It is often impossible during the first two or three days after injury to distinguish which portion of the burn is of the third degree and in which areas the skin necrosis is not so deep.

It is generally recognized that the therapy of burns can be divided into systemic treatment and local treatment of the burn wound. Since systemic treatment is the much more important of the two, I shall discuss it first.

SYSTEMIC TREATMENT

Primary shock or vasomotor collapse is induced by excitement and pain and in itself is not serious. Morphine and meperidine (Demerol) in small doses administered intravenously, since otherwise they are poorly absorbed when the patient is in shock, are the drugs for the treatment of pain. Large doses are not often required, because the pain is usually not excruciating or prolonged. If mania is present, it must be determined whether it is due to pain, hysteria, or anoxia. If it is caused by hysteria, barbiturates should be administered; if due to anoxia, oxygen gives relief, and both the depressants, morphine and barbiturates, should be avoided.

Secondary shock, the result of loss of the circulating blood volume, is the vicious shock and is proportionate to the extent of the burn and not the degree. Massive loss and translocation of the body fluids occur. Urinary output is reduced.

The fluid and electrolytes that are lost through exudation and are shifted to form the edema are withdrawn from the circulating blood. The body

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reacts by withdrawing fluid and electrolytes from the unburned portions of the body into the blood stream. The fluid at the site of the burn is rich in protein and sodium.

While water and sodium are being lost from the body or bound in the region of the wound, potassium is being released from the injured site and a harmful excess can accumulate unless an adequate urinary output is maintained.

A loss of erythrocytes occurs also. In extensive and deep burns, destruction of red blood cells may be great and hematuria may appear within a short time after the burn has been incurred. Early gross hematuria carries a grave prognosis.

As a result of the above-described pathologic physiology, the condition of the patient is manifested clinically by (1) a fall in blood pressure, (2) a rapid pulse, (3) a decreased urinary output, (4) an overwhelming thirst, (5) a rise in hematocrit reading, (6) a mental state of agitation or restlessness, and (7) possibly nausea and vomiting.

The first duty to the severely burned patient is to provide an adequate amount of blood, fluid, and electrolytes to replace that which is being lost as a result of the burn. As pointed out by Amspacher,³ these requirements are not altered by pressure dressings or use of steroids. The latter probably have no or, at least, little place in the treatment of burns.

A number of schemes have been presented in an attempt to formularize the treatment of burn shock. That of Evans and co-workers⁴ has been more widely publicized and accepted than others. It must always be remembered, however, that treatment must be individualized and altered as indicated by careful observation of the patient.

It is preferable to administer fluid and food orally whenever possible. A good solution for oral use is that of Moyer,¹ which is made by adding 1 tsp. of table salt and $\frac{1}{2}$ tsp. of baking soda to 1 qt. of water. Adults with burns of less than 20 per cent of the body surface do not ordinarily require intravenous therapy for shock. Children usually require such administration when 12 per cent or more of their body surface is burned. If prolonged administration is anticipated, a plastic intravenous needle should be used. If no veins are available, an intrasternal needle can be used to administer blood and fluids.

According to the formula of Evans and associates,⁴ for the first twenty-four hours, 1 cc. of electrolyte solution is given intravenously per kilogram (2.2 lb.) of body weight for each 1 per

cent of the body surface burned. One cubic centimeter of colloidal solution (blood, plasma, or plasma substitute) is also given intravenously per kilogram of body weight for each 1 per cent of body surface burned. Whole blood is the best agent with which to combat shock. Plasma is best not used because of the danger of serum hepatitis. A plasma substitute, such as dextran, may be administered while awaiting the results of crossmatching of the blood. Adults with severe burns may require as much as 2,000 cc. of blood given intravenously during the first twenty-four hours. In addition, 30 to 50 cc. of 5 per cent solution of dextrose per kilogram of body weight is given orally over the twenty-four-hour period. Until renal function is known to be adequate, milk and fruit juices should not be given, since they contain potassium which is already being liberated from the body in excessive amounts.

As has been indicated, the surface extent of the burned area must be estimated as accurately as possible. The rule of nines proposed by Wallace⁵ serves well for this purpose. This rule assigns a value of 9 per cent to the head, neck, and each upper extremity and 18 per cent (2×9) to each lower extremity, the front of the thorax and abdomen, and the back of the trunk. A value of 1 per cent is assigned to the perineum.

For any burn of more than 50 per cent of the body surface, fluids should be calculated on the basis of a 50 per cent involvement to prevent overtreatment. For adults, a total of 10,000 cc. of fluid in the first twenty-four hours is usually the maximum required. In children, particular care must be taken not to overload the circulation and produce pulmonary edema with fluids given intravenously.

If there has been some delay between the time the burn occurred and the time the patient came under treatment, the original fluids should be given at a rather rapid rate. It is usually advisable to give one-half of the calculated first twenty-four hours' requirement in the first eight hours of therapy.

The urinary output, as pointed out by Cope,⁶ is usually, but not always, an excellent index of the adequacy of fluid therapy. An indwelling catheter should be inserted when the patient is first seen and the hourly urinary output accurately measured and recorded. Cope stated that a urinary flow of at least 20 cc. per hour should be maintained in an adult. A flow of 100 cc. or more per hour indicates excessively vigorous therapy. Development of the earliest signs of pulmonary edema is an urgent indication

that fluid administration should be reduced.

The choice of fluid is important. Ringer's solution, Hartmann's solution, or isotonic sodium chloride solution is preferred in the order given. Sodium and chloride are the chief ions lost during the acute stage of the burn. As the edema begins to subside forty-eight to seventy-two hours after the burn, a portion of the electrolytes lost into the edema fluid is resorbed into the circulation. For the second twenty-four-hour period, the electrolyte and colloid requirement is roughly one-half that of the first twenty-four hours, while the nonelectrolyte requirement remains unchanged. It is important to administer considerable sodium, chloride, and water during the first forty-eight hours only and less in the next forty-eight to seventy-two hours.

Complete blood counts and determination of the hematocrit level, the level of serum electrolytes, and the carbon-dioxide combining power as well as the urinary output help in determining the amount and type of fluid to be administered. By the end of forty-eight hours, the patient is usually able to tolerate food by mouth, and intravenous therapy should be reduced as rapidly as oral intake can be increased. A high-protein, high-caloric diet with adequate vitamin supplements will be required, and the patient should be encouraged to take these from the earliest possible moment.

LOCAL TREATMENT

Local treatment of the burn is begun as soon as the patient's general condition has been evaluated and the treatment of shock, if indicated, has been instituted. It is even begun before this if the physician, nurses, and all attendants use masks and sterile gloves to prevent droplet contamination and that which results from bacterially dirty fingers. Local therapy is currently divided into two broad classifications: (1) open and (2) closed. Neither is entirely satisfactory in all cases. Whether the open or closed method is elected, no more than superficial débridement of the burned areas should be done.

If closed therapy is chosen, it is important that the dressing applied afford a mild degree of even pressure, be as occlusive as possible, and be protective. The dressing should be abundant, absorbent, and comfortable. It has not been established that any medication or ointment is required or desirable beneath the dressing. If an ointment is used, it must be applied very sparingly so that it does not clog the openings of the fabric in contact with the wound. Burned hands should always, in my opinion, be treated by the closed method, since only by this method

may they be maintained in the position of function. It is also probably best to treat severely burned children by the closed method.

Open or exposure therapy has worked well in the hands of many surgeons. The burns are not dressed, and the patient forms his own protective covering when the exudate coagulates and becomes a crust. The patient is laid on a laundry-clean sheet, and the burned area is kept out of contact with solid objects. The room should be kept comfortably warm without drafts. A cradle over the bed is helpful, but no heat should be applied within the cradle. The burned areas are not touched or dressed except where infection develops beneath the crust or a crack develops in the crust. In such cases, the crust in the involved area is removed and the area covered with sterile gauze. Burns of the face and perineum are always best treated by the open method. Several articles have been published about early excision and immediate skin grafting of localized third-degree burns. Although it is occasionally possible to execute such a plan, the burned tissue should not be excised until at least two or three days after the injury and until the burned area has become well demarcated.

TREATMENT OF COMPLICATIONS

All third-degree burns, if extensive, are followed by complications which may be pernicious. Respiratory burns are usually caused by the inhalation of noxious gases, and the effects of such injuries may not be noticed for several hours. The development of respiratory difficulty may indicate the need for oxygen therapy and, in some cases, tracheotomy.

Third-degree circumferential burns around the trunk or an extremity may interfere with respiration or circulation. The constriction should be relieved by placing longitudinal incisions through the depth of the burned surface.

Tetanus is an ever-present hazard, and tetanus toxoid or antitoxin should be administered to all patients with third-degree burns.

Antibiotic therapy should be used routinely in severe burns in an attempt to combat that great secondary killer, infection. Penicillin is usually the antibiotic of choice, but the tetracycline drugs may be indicated when penicillin is contraindicated.

Other complications that require treatment include renal or hepatic failure, peptic ulcer with hemorrhage or perforation, fluid and electrolyte imbalance, severe anemia, malnutrition, psychosis, and infection.

As soon as possible after shock therapy has been instituted, the severely burned patient

should be transferred to the place where definitive therapy is to be given. This move may prevent painful and dangerous movement at a later date and is of much help to the surgeon who is to continue the treatment.

Definitive treatment after the first forty-eight hours becomes one of total maintenance, replacement of blood, alimentation, treatment of infection, skin grafting, and psychiatric care. As Ampacher³ has pointed out, this phase of treatment is much more complicated and difficult than early treatment.

SEPARATION OF THE ESCHAR

Most burn eschars begin to separate spontaneously after seven to ten days. In deep third-degree burns, a dry eschar may persist much like a tough piece of leather. Careful surgical débridement of such areas should be carried out as soon as they are clearly demarcated and the general condition of the patient permits. Saline wet dressings applied for two to three days after such débridement usually produces a bed suitable for early skin grafting.

As emphasized by Moyer,¹ nontraumatic cleansing of dirty or crusted infected burn wounds may be accomplished by frequent changing (every one to three hours) of thick, uncovered, saline wet dressings.

SKIN GRAFTING

The surgeon should strive in all burns to begin his split-grafting procedures by the second or third week. There is no longer any excuse to allow a patient to lie around for months in the hope that the areas of the third-degree burn will epithelize from the periphery. As granulations pile up, they present ideal beds for the development of deep-seated infections which only continue to undermine the general condition of the patient. Likewise, granulations eventually are replaced with thick scars, and such scars produce secondary contractures. It is imperative that all burns of the hands be covered with split-thickness grafts by the eighteenth or twentieth day and sooner, when possible, if troublesome contractures which may require extensive reconstructive procedures are to be avoided.

The mechanical dermatomes have in a way

become a hazard. With them, donor areas may be so smoothly and deeply denuded that injury is added to injury. The taking of grafts is still an art to be practiced by experienced or, at least, carefully directed hands.

Split-thickness homografts taken from the body of a recently deceased person or, in selected instances, from living donors have proved to be very efficacious as temporary, self-attached biologic dressings that reduce loss of fluid, the area subject to infection, and subsequent malnutrition states. Staged autograft coverage of large defects is made much easier by the use of homografts.

Only after healing is complete with the patient's own epithelial cells is the danger of infection and malnutrition overcome. Such healing is hastened immeasurably by the intelligent use of split-thickness skin grafts. Early skin grafting not only hastens healing but prevents contractures and deformities and, thus, reduces the number of reconstructive procedures and the rehabilitative time required at a later date.

ELECTRICAL AND ACTINIC-RAY BURNS

Electrical burns are usually of third degree and present special problems. Not only may the full thickness of the skin be involved but the underlying subcutaneous tissues, muscles, nerves, and blood vessels may be completely destroyed. It is at first usually impossible to judge the full depth of electrical burns. Again, however, the aim of local treatment should be to eliminate the necrotic tissue and obtain healing by the application of skin grafts as soon as possible. Occasionally, the circulation is so impaired after an electrical burn that gangrene results and amputation is required. One must be particularly observant for any evidence of gas gangrene following a deep electrical burn.

Lastly, I should like to emphasize the importance of avoiding *actinic-ray burns*. I should not have to emphasize the cumulative effect of roentgen-ray exposure, but every year my colleagues and I still see several physicians and dentists who have not heeded the warnings of their professors of radiology and the makers of x-ray machines. If 90 per cent of all thermal burns are preventable, so are 100 per cent of all x-ray burns among physicians and dentists.

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The Treatment of Warts

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DURING THE PAST TWO YEARS, I have had four exhibits on Tumors of the Skin in our local and national conventions. Many physicians saw the exhibits, and it was somewhat of a surprise to me to find that their most common query was not "How do you treat epitheliomas?" but "How do you treat warts?" or, in many instances, more specifically, "How do you treat plantar warts?"

These questions will be answered in the following discussion which will be limited to the treatment of the five classical types of *viral* warts, namely: (1) *verruca vulgaris* (common warts), (2) *verruca plantaris* (plantar warts), (3) *verruca plana juvenilis* (flat warts), (4) *verruca filiformis* (filiform and digitate warts), and (5) *verruca acuminata* (venereal warts).

GENERAL CONSIDERATIONS

The common indications for treatment are:

1. *Symptoms* of (a) tenderness or pain, such as that present in lesions over pressure points of the hands and soles, and (b) interference with bodily functions due to size, abundance, or location.

2. *Cosmetic disfiguration.*

3. *Infectivity.* All five clinical types of warts are autoinoculable and transmissible and are believed by most investigators to be caused by the same, or possibly by two, types of viruses.

Anatomically, each lesion is a localized hyperplasia of the epidermis only. Hence, one should strive to produce a minimum amount of permanent injury to the underlying cutis when removing it. See figure 1.

Epidemiologically, the virus which causes warts is localized in the epidermal cells of each lesion. The amount of contact exposure and the length of incubation period necessary for the production of warts are quite varied. Many warts disappear without treatment in an average of two to three years, but, if this is due to the development of some immunity in man, it is lit-

tle understood. Certainly, the psychologic mechanism by which warts are "charmed" away is not understood.

Localized inflammatory reaction induced by various physical and chemical agents is adequate in many instances to cause the lesions to disappear.

The *frequency of recurrence* of some warts and the necessity for repeated treatments, if indicated, should be frankly discussed with patients on their first visit, and the therapist should not be discouraged easily thereafter.

Plantar warts are sometimes difficult, if not impossible, to distinguish from tender calluses over pressure points, such as the distal metatarsal joints, a fact which is very important in determining the choice of treatment.

Orthopedic supportive measures in the case of plantar warts to change the weight-bearing surfaces of the feet include changes in shoe lasts, pads, metatarsal bars, adhesives, moleskin, and so forth.

Specific therapeutic technics are used for given problems, but the multiplicity of available measures is ample evidence of the need of a uniformly successful method.

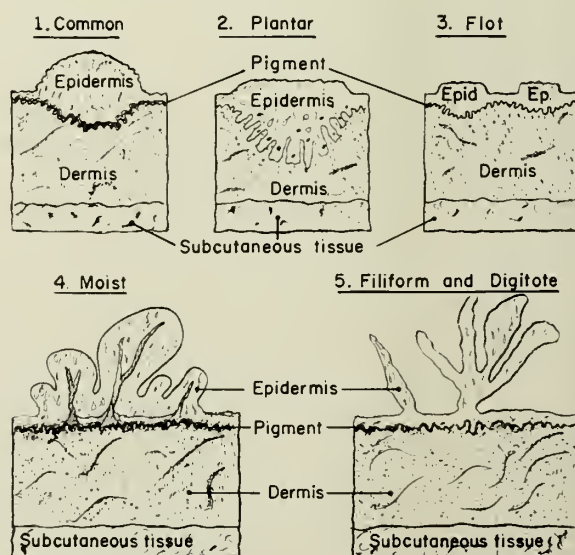


Fig. 1. The anatomy of warts.

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The choice of a given technic or combination of procedures should be governed by the following factors:

1. *The individual:* (a) his predisposition to keloid formation, (b) his general state of health, and (c) his age and psychologic requirements, especially in regard to adequate sedation if surgical measures are used.

2. The type, location, and number of lesions to be treated.

3. The modalities available to the physician.

4. The physician's competence and experience in the use of the modalities which are available to him.

5. The toxic effects of local, parenteral, or oral medication.

6. Postsurgical or roentgen effects and loss of pigmentation.

SPECIFIC THERAPEUTIC TECHNIQUES

Although the physician may hold the treatment of warts in light regard, their management is of imminent importance to the patient regardless of his state of enlightenment. Hence, we feel that adequate preparation with sedation or reassurance is almost always desirable. The topical anesthetic, where indicated, is usually 2 per cent procaine with or without 0.01 per cent epinephrine. The site to be surgically treated should be carefully and thoroughly anesthetized by injection with a 26- to 28-gauge needle into the upper third of the dermis (papillary layer).

The scalpel with a No. 15 ASR small dissecting blade, the dermal and mastoid curets and a small curved scissors are, perhaps, the handiest instruments for removing single, large, common, or plantar warts. With these instruments, a single large wart may be removed by using the scalpel to cut through the epidermis, including a 1.0 mm. rim of normal tissue around the wart. The cut should be just deep enough to produce slight bleeding points from the capillaries in the papillary layer; it *should not* extend through the dermis. The wart and its small rim of normal epidermis may then be skillfully teased out of its bed in the dermis with the scalpel or curet almost in toto as a small, solid mass. The underlying surface on the dermis is further curetted to remove fragments of infected epidermis, and bleeding may be easily controlled by a pressure dressing or by painting the site with trichloroacetic acid (not too much) or by touching the bleeding points with a hot "black cautery" tip. When bleeding has stopped, the area is sponged with rubbing alcohol and either a sterile dry dressing or antibiotic ointment dressing is applied. If the dermis has not been unnecessarily

damaged, healing is relatively rapid and discomfort or disability rarely ensues.

Electrodesiccation is probably the most common technic for removal of warts in general, using either the relatively coarse spark of instruments like the Hyfrecator or the fine cutting diathermy of instruments like the Majestic, Bowie, and so forth. With this method, the wart is desiccated either piecemeal or in toto at one sitting, and the desiccated material is removed with curets or small curved scissors. Dressings are optional, according to the location of the lesions. It is important to avoid deep injury to the dermis regardless of the type of desiccation or thermal canterly used. Chemical coagulants and caustics, especially trichloroacetic acid, are very helpful in special cases and particularly as an adjunctive measure where regular periodic paring down is used as a compromise technic of removal. Blank and Rake's excellent book on Viral and Rickettsial diseases contains a good detailed account of the application of chemical agents used in the destruction of warts.

The CO₂ pencil or liquid nitrogen (using a cotton applicator) may be carefully applied to individual lesions for 10 to 200 seconds to produce a severe, sharply localized, inflammatory edema of the lesion, which may result in its separation from the cutis so that it may be easily dissected from its mooring in a couple of days with the small curved scissors. The inflammatory reaction itself is frequently sufficient to cause the involution of the lesion.

Repeated scaling doses of ultraviolet light are helpful in the treatment of large crops of flat warts, especially about the face or dorsa of the hands. Internal bismuth, mercury, and arsenic medications have no specific effect on the virus of the warts, although they not infrequently prove to be helpful adjunctive therapeutic measures.

Local infiltrative techniques with bismuth proved rather painful and in most instances impractical.

X-ray or radium therapy is a choice procedure in many instances when only a few warts are present. One or two treatments of a given lesion are usually adequate. The dose should be carefully determined by an expert according to the size of the lesion, and the surrounding tissues must be judiciously shielded by lead, leaded rubber, or special cones. The advantage of irradiation therapy is, of course, the avoidance of open wounds. The lesions usually undergo involution in four to six weeks from a single treatment in about 70 per cent of cases and in about 85 per cent of cases from the two-dose technic. Large areas and lesions over bony prominences

are best managed by means of other modalities.

Suggestion therapy has been used since earliest times and is still favorably looked upon by a few. The mechanism by which the virus causing warts is psychologically discouraged is not understood. Suggestion therapy is most successful in the treatment of flat warts.

Vaccine therapy involves a complicated technique to prepare the autolysate, and its virtue has not been generally substantiated.

GENERAL CONSIDERATIONS IN SUMMARY

1. Before warts are treated, they should be examined critically and distinguished from other lesions which they may simulate.
2. Warts are caused by a virus and are auto-inoculable and transmissible.
3. Warts represent a tumorous hyperplasia of the epidermis only, and the excessive destruction of dermis and pigment layers of the skin is not necessary for their eradication.

THE FEASIBILITY of primary repair of a tendon is often determined by the time lapse since the injury occurred. No more than two hours should elapse before primary surgery is attempted for injuries of flexor tendons of the digits, four to six hours for most other tendon injuries, and eight hours for injuries of the wrist or the dorsum of the hand.

Lacerating or incised wounds are more suitable for immediate treatment than are crushing, abrading, or explosive injuries. Tendon lesions associated with fracture should usually not be repaired at once. If skin and subcutaneous tissue are inadequate, the defect must be closed and the tendon repaired later.

Primary repair is more frequently feasible for extensor than for flexor tendons. If the lower forearm or wrist is the site of tendon division and other conditions are satisfactory, repair should be done at once. Primary repair is usually advisable for tendon division in the palm; often, both profundus and sublimis tendons can be repaired.

Tendon damage between the proximal end of the fibrous sheath in the palm and the middle of the middle phalanx may involve the profundus tendon, the sublimis tendon, or both. Injury of the sublimis tendon alone requires no repair. Secondary rather than primary repair is advisable if the profundus alone is involved or, usually, if both tendons have been divided. However, primary suture may be successful in very young persons seen within two hours after injury under otherwise propitious circumstances. If primary repair is attempted, the overlying fibrous sheath must be removed to permit contact of the suture line with subcutaneous fat.

Profundus division over the distal half of the middle phalanx can usually be repaired primarily. Primary suture is generally advisable also for thumb injuries.

Whether primary repair should be performed also depends upon the general condition of the patient, the existence of other injuries, the availability of suitable suture material and instruments, and the amount of time available.

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New Drugs in Obstetrics and Gynecology

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IN RECENT YEARS, several interesting drugs have been added to the obstetric and gynecologic armamentarium. Of these, some have already proved useful in daily practice, while others, on the basis of early research, give considerable promise of clinical value. In a brief discussion, it will be possible to mention only drugs having their greatest importance in the fields of obstetrics and gynecology and, of these, only a representative few. Among the host of new drugs being produced annually are many which have occasional or even frequent obstetric use but which are not primarily associated therewith: for example, oral hypoglycemics, new antibiotics, and long-acting local anesthetics; these will not be considered further. Likewise, the radioisotopes and mitotic blocking agents will be omitted, and nothing will be said concerning new applications or technics with older drugs, such as estrogen as a hemostatic agent. From the entire array of new drugs, a small group of promising agents has been somewhat arbitrarily selected. Of these, two will be considered in some detail and several others more briefly from the classic aspects of action, indication, administration, and therapeutic effect.

The hormone relaxin (Releasin) is prepared from the ovaries of pregnant sows. It has been characterized as a small protein or polypeptide molecule and numerous of its amino-acid constituents have been identified, though the structure is not yet fully known.¹ Historically, the earliest work on relaxin was done twenty-five years ago by Hisaw and his associates at the University of Wisconsin. Little further progress was made until quite recently when the substance was restudied by several groups interested in both physiology and clinical applications. The basic hormonal action in animals and the one upon which the bio-assay depends is the relaxation of the pubic symphysis in estrogen-

primed guinea pigs. This separation is due to a depolymerization of the fibrous tissue ground substance and an increase in water content of the symphysis. Increased blood titers of relaxin during pregnancy with a sharp postpartum decrease have been noted in both animals and human beings,² so the hormone is established as having some role in human pregnancy, though roentgenologically there is scant demonstrable action on the human symphysis.

The action of relaxin on the myometrium is controversial; in animals, it decreases contractility but, in human beings, the picture is less clear. The first clinical reports suggested excellent suppression of premature labor,³ but more recent workers using a tocodynamometer⁴ or an intrauterine carbon electrode⁵ were able to detect little, if any, suppression of contractions after intravenous administration of the drug to both term and preterm patients. The action on the cervix is more clear-cut; most clinical evaluators have commented on the rapidity of delivery and the softness of the cervix following relaxin administration. In various domestic animals, including the cow and the sow, softening and dilation have been objectively demonstrated.⁶

In view of these partially antagonistic actions of the hormone, the indications for its use are far from clear. In the therapy of premature labor, with or without ruptured membranes, it may be of value.⁷ It is being evaluated as an adjuvant to medical induction with an unripe cervix. Thirdly, it has been suggested for use in labors complicated by so-called "cervical dystocia" and even for routine use in normal primiparas. Finally, relaxin is currently being evaluated for treatment of primary dysmenorrhea.

The administration is either intramuscular, intravenous, or, experimentally, oral. For premature labor, the suggested intramuscular dosage has been 80 mg. initially followed by 40 mg. every four hours. Intravenously, 160 to 300 mg. has been added to a liter of fluid at slow drip. Total dosages range from 80 to 2,300 mg. In addition to relaxin, Lutrexin, an older form of aqueous ovarian extract, has recently been re-investigated and shown to contain activity similar, though not identical, to relaxin. Several clin-

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ical investigators have reported its use in the management of premature labor.

Results from the use of relaxin are so far fragmentary. One group reported fair success in halting premature labors in the 28- to 32-week range;⁸ the authors were able to stop 37 per cent of all their premature labors. Another group was able to arrest only 1 to 25 patients at term.⁵ The most common complications of therapy have been, first, occasional chills after intravenous administration and, second, some very rapid labors after cessation of administration, presumably due to the cervical softening. The great, though recently reduced, expense of the drug diminishes its availability considerably. No adequate series on the use of relaxin to potentiate inductions has been published to date. In summary, the place of this drug is not yet established; its cervical softening properties may well prove to be the most significant.

In recent years, there has been much interest in various progesterone analogues, partly as a result of the central position of progesterone in the metabolic cycle of steroid hormones.^{9,10} A by-product of this work has been the long-acting progestational compound 17-OH progesterone caproate marketed as Delalutin. In animals, free 17-OH progesterone is progestational and somewhat androgenic; the effects vary greatly with the species being examined,¹¹ but generally its administration results in an increase in urinary androgen and progesterone metabolites. In man, however, free 17-OH progesterone is not significantly androgenic or progestational.

Delalutin is therapeutically a very potent long-acting progesterone with all the customary effects of that hormone. Why esterification with a long-chain fatty acid brings about this change in activity in the human being has not been explained; possibly delayed absorption is involved but, more probably, there is slow metabolism of the ester. Withdrawal bleeding occurs two to three weeks after a single injection in an estrogen-primed castrate.¹² There is typical secretory endometrium and the usual thermogenic response.

The most obvious indication for Delalutin is the cyclic therapy of secondary amenorrhea, in which situation a near normal cycle can be produced with only two injections.¹³ For those who believe in progesterone in the management of threatened or habitual abortion, the long-acting preparation offers obvious advantages. Lastly, the drug has been employed on a research basis in the "medical curettage" treatment of proved dysfunctional uterine bleeding.

Delalutin is administered as a single 375- to 500-mg. injection in oil, being usually preceded by a

course of stilbestrol or an injection of a long-acting estrogen, such as estradiol valerate (Delestrogen), given about two weeks previously.

Results in the reported series of secondary amenorrhea have been gratifying.^{12,13} Cyclic bleeding has been achieved easily and uniformly, the regime being far superior to oral progesterone or a single injection of progesterone and even better than multiple injection therapy. There is, of course, no suggestion of induced ovulation. It is too early to evaluate the place of Delalutin in the management of abortion or its use in dysfunctional bleeding.

The problem of toxemia unfortunately remains to be solved, but, in the interval preceding this millennium, several of the hypotensive agents have proved helpful. From the obstetric point of view, there is interest in two classes of agents, the ganglionic blockers and the centrally acting compounds which affect the vasomotor center. Among the former are the quaternary amines, such as hexamethonium (Bistrium) and pentolinium (Ansolysen) or, more recently, a secondary amine, mecamlamine (Inversin), which, on oral administration, is the best absorbed of the group. Centrally acting agents include the Rauwolfia derivatives, such as Serpasil, hydralazine (Apresoline),¹⁴ and the purified veratrum compounds,¹⁵ such as cryptenamine (Unitensin).

The clinical manifestations of toxemia are seen in two types of patients—those with pre-existing chronic hypertensive vascular disease and those with the typical preeclampsia-eclampsia syndrome. In the former, the vascular spasm and the resultant hypertension have been shown to be mediated primarily through neural impulse, while, with the latter, a humeral mechanism is invoked.¹⁶ The chronic hypertensive patient is, therefore, more likely to be helped by ganglionic blockade, while the true preeclamptic or eclamptic patient will be benefited more by agents acting upon the vasomotor center.

With mild toxemia, tranquilizing agents and Rauwolfia derivatives have been helpful. Severe chronic hypertensive patients have been benefited by use of the ganglionic blocking agents in addition to the customary hospital management. For the preeclampsia-eclampsia syndrome, a combination of a veratrum derivative, such as Unitensin with Apresoline, has been quite satisfactory.^{17,18} The drugs act additively in lowering blood pressure, but some of their side effects, particularly on the heart, cancel out with resultant benefit to the patient.

Administration of these agents is usually intravenous, particularly with seriously ill patients. Initial dosages have ranged from 20 to 40 mg.

of Apresoline combined in a slow drip with 0.5 to 1.0 mg. of Unitensen. For milder degrees of toxemia, oral dosages of Apresoline range up to 400 mg. per day.

Results with hypotensive adjuvant therapy have been encouraging.^{14,17} In one rather large series, diastolic blood pressure was lowered an average of 43 per cent. Improved cerebral blood flow has been noted, and some patients with early severe toxemias have been carried to fetal viability.¹⁸ Effects on albuminuria have varied. It must be re-emphasized that such therapy does not cure the disease but merely alleviates one sign of the complex. All the customary therapeutic regimen and obstetric management must continue.

The sedative-antiemetic drugs, such as Thorazine, Compazine, and Sparine, are closely related chemically to the antihistamine, Phenergan, with which they share several activities, though they themselves are only slightly antihistaminic. In a manner not fully understood, they are specifically depressant upon the central reflex arc concerned with vomiting. In addition, without being narcotic, they have the ability to potentiate various narcotics and sedatives, sometimes to a remarkable degree.

Indications for these tranquilizers have included therapy of nausea and vomiting of pregnancy and true hyperemesis gravidarum,¹⁹ potentiation of analgesia during labor,^{20,21} narcotic potentiation for patients with far-advanced cancer, the prevention of nausea associated with extensive radiation or the administration of agents such as nitrogen mustard, and the routine management of postoperative patients.²²

Administration may be oral, intramuscular, or intravenous in dosages ranging from 25 to several hundred milligrams per day for Thorazine and Sparine; the maximum daily dose of Compazine given orally is 40 mg. In the labor patient, several authors have studied dosage combinations, employing Thorazine to potentiate barbiturates and narcotics, thus decreasing the total

need for these agents.²¹ The Harvard group, particularly, has been interested in avoiding entirely the use of narcotics. They give a combination of Seconal, scopolamine, and Thorazine.^{20,23} In the management of vomiting, the results with these agents have been fair to good; some authors have reported up to 80 per cent success.¹⁹ With true hyperemesis, the ataraxics have been similarly helpful.¹⁹ During labor, several authors have reported a significant decrease (up to 50 per cent) in the amount of narcotics required and less need for fetal resuscitation.²⁴ Almost no jaundice has been noted in obstetric use. In terminal cancer patients, the drugs have been quite useful, though if survival greater than three months is anticipated, cordotomy is usually recommended.

Finally, new agents useful in the treatment of vaginitis should be briefly considered. The fact that there are so many such drugs introduced annually suggests that none is wholly satisfactory, and this continues to be the case. For moniliasis, Nystatin is an oral and topical antibiotic which has been quite effective, though the relapse rate is high.²⁵ A topical benzothiazole (Asterol) has also been effective in several reported series. Trichomonas therapy is even less satisfactory. The much-heralded Tritheon oral regime has proved to be almost totally useless (44 failures of 44 trials in one well-controlled series).²⁶ Numerous workers are trying combinations of detergents, wetting agents, and chelating agents marketed under such names as Lauric, Trichotine, and Vagisec, all with indifferent degrees of success. The furazolidone suppository and powder, Tricofuron, has been perhaps the most helpful of the new agents,²⁷ but it must be admitted that the management of the vaginitides remains far from satisfactory.

It is hoped that the foregoing brief listing of new and near-new agents may have collected rather widely scattered information and may even have suggested new approaches to some common problems in obstetrics and gynecology.

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MEMBRANES RUPTURE PREMATURELY in about 4 per cent of all pregnancies, usually during the thirty-sixth or thirty-seventh week of gestation. Labor and delivery ensue within seventy-two hours in over three-fourths of instances. Patients should be hospitalized for at least three days after premature rupture. Patients may then be discharged if labor is not in progress and leakage of amniotic fluid has ceased. Rupture predisposes to prolapse of the umbilical cord.

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THE MORTALITY from hemolytic disease of the newborn can be lowered in selected patients by inducing labor. During an Rh-incompatible pregnancy, the mother's serum should be tested monthly by Coombs' method for Rh antibodies. Tests are made weekly after the thirty-second week if antibodies are detected earlier.

Decision to induce labor is based on the patient's history and on antibody titers. Induction is usually advisable if stillbirth has previously occurred because of hemolytic disease and the husband is homozygous Rh-positive. Labor should probably be induced if maternal antibody titer is 1:64 or more or if titer is rising. During the last few weeks of pregnancy, alteration in fetal heart tones or diminution of movement may require cesarean section. Time at which labor is induced depends upon the condition of the individual patient.

After delivery, exchange transfusion is performed if the hemoglobin of the cord blood is below 14.8 gm. or if hemoglobin is between 14.8 and 17.7 gm. and serum bilirubin is greater than 2.7 mg. per 100 cc. Fresh heparinized blood is probably preferable to stored citrated blood for exchange transfusion.

Infant mortality was 29 per cent among 63 Rh-incompatible pregnancies culminating in spontaneous delivery and 16 per cent in 76 instances of induced labor. Disease was probably more severe in the induced group, as indicated by the greater frequency with which exchange transfusion was required. Pregnancies in which the fetus died in utero before the thirty-sixth week were excluded from the study.

O. D. FISHER, M.D., Queen's University, Belfast. *Brit. M. J.* 5019:615-617, 1957.

Relationship of ECHO and Coxsackie Viruses to Paralytic and Nonparalytic Poliomyelitis

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IN THE LAST FIVE YEARS, great advances have been made toward the conquest of paralytic poliomyelitis, and those who have contributed, whether financially, scientifically, or professionally, doubtless feel a sense of satisfaction.

The pursuit of scientific knowledge, however, is never-ending. In some ways, it resembles the experiences of an Alpine climber who, when he has successfully scaled a particularly precipitous peak, sees stretching before him scores of other new and previously invisible mountain ranges.

Today, research workers interested in enteric viruses are confronted with a situation similar to an Alpine climber. They have learned a great deal about the 3 known types of polioviruses, how these are spread and how their lethal effects may be held in check. In the process of searching for polioviruses in human fecal material, however, they have found scores of other viral agents, we might almost say "fellow travelers," some of which are capable of producing human ailments that can be confused with non-paralytic poliomyelitis and others which sometimes appear to bring about a real paralytic disease. It is these "fellow travelers" that I want to discuss.

Chronologically, the first of such agents to be discovered was a Coxsackie virus. Coxsackie is the interesting name of a little town located in the valley of the Hudson River in New York State where Dalldorf and Sickles¹ isolated their original strain in 1948. Three years later, Robbins and associates² reported that they had found another enteric agent which was not inactivated by antisera against the 3 known types of polioviruses and which, unlike the Coxsackie viruses, did not produce illness when inoculated into baby mice. They had stumbled upon the first of the ECHO viruses.

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To proceed in a logical manner, it seems appropriate to discuss these agents in the order in which they were discovered.

THE COXSACKIE VIRUSES

While the name, Coxsackie viruses, is of relatively recent origin, some of the disease syndromes caused by these agents have been recognized for more than a half century. In 1872, for example, two Norwegian physicians, Daac and Homann, described an outbreak of epidemic myalgia under the name of contagious muscular rheumatism. Other workers in Denmark and Sweden have referred to this entity as Bornholm disease and sometimes as pleurodynia.

In 1953, some sixty years later, Melnick³ suggested that certain outbreaks of pleurodynia and aseptic meningitis, which had occurred in Connecticut, Rhode Island, and New York State in 1948, were actually due to a Coxsackie virus, probably type B-1. As the names of these disease entities suggest, the characteristic symptoms of epidemic myalgia or pleurodynia are muscular pains in the lower part of the thorax or upper abdomen. Other symptoms include fever and headache, which are at times associated with stiffness of the neck and pains in other parts of the body.

In 1920, Zahorsky described a new clinical entity and gave it the name herpangina. This ailment often occurs in epidemic form, usually in the late summer and particularly among children. It is characterized by a relatively abrupt onset of fever and the appearance of greyish vesicles followed by shallow ulcers in the oropharynx. Anorexia and dysphagia are frequently observed. In some cases, vomiting and abdominal pain may be present.

On a basis of the experimental disease, the strains of Coxsackie viruses isolated so far appear to fall into 2 major groups. Group A includes those strains which in suckling mice induce lesions in muscle tissues only. Epidemics of herpangina are usually associated with group A Coxsackie viruses. The group B strains when inoculated into baby mice produce lesions in the

brain, muscles, fat pads, pancreas, and other organs. Epidemic myalgia and pleurodynia usually seem to be caused by group B Cocksackie viruses.

Nineteen types of group A and 5 of group B Cocksackie viruses are recognized at the present time, making a total of 24 types in all. Some of them rapidly destroy living cells in tissue cultures and, therefore, must be differentiated from other cytopathogenic enteric viruses, such as the polioviruses and ECHO viruses. All of the group B Cocksackie viruses attack HeLa and monkey kidney cells and 5 of the group A viruses: namely, types A-9, A-11, A-13, A-15, and A-18, behave in a similar manner.

Standard type-specific antisera are being prepared in monkeys and rabbits to differentiate the cytopathic Cocksackie viruses from polioviruses and ECHO viruses. This project, a laborious and time-consuming undertaking, will cost the National Foundation for Infantile Paralysis more than a quarter of a million dollars. High titered antisera in monkeys are being made by Dr. Herbert Wenner of the University of Kansas, while potent antisera in rabbits are being prepared on a commercial basis by Microbiological Associates of Bethesda, Maryland.

The geographic distribution of the Cocksackie and ECHO viruses is world-wide as indicated in the map. Many articles reporting the isolation of Cocksackie viruses have been published from America, Europe, Australia, and South Africa. Not long ago, I received monographs on the Cocksackie viruses of Brazil reported by de Goez⁴ in 1954 and of Finland by Poljanpelto⁵ in 1955.

To those who are closely connected with the problems of infantile paralysis, syndromes such as pleurodynia and herpangina are perhaps of slightly less immediate concern than outbreaks of aseptic meningitis and, particularly, of "paralytic poliomyelitis." It is precisely because a number of Cocksackie viruses have been isolated from the stools of patients diagnosed clinically as having aseptic meningitis and sometimes "paralytic poliomyelitis," that investigations of these agents are being pursued with vigor at the present time.

Table 1 indicates that 8 types of group A Cocksackie viruses have been encountered in fecal material from patients with aseptic meningitis, and 2 of them were also isolated from specimens of cerebrospinal fluid. In addition, 5 types were obtained from fecal specimens taken from para-



TABLE 1
ISOLATIONS OF GROUP A COXSACKIE VIRUSES FROM CASES
OF ASEPTIC MENINGITIS AND "PARALYTIC POLIOMYELITIS"

Virus type	Isolations from		Reported by
	Feces from paralytic cases	Cerebrospinal fluid	
A-1	+	+	Melnick et al. (1951)
A-4	+	+	de Goes (1954) Pohjanpelto (1955)
A-5	+		Pohjanpelto (1955)
A-6	+		Johnsson (1956) Johnsson (1956)
A-7	+	+	Chumakov et al. (unpublished)
A-8	+	+	Melnick et al. (1951)
A-9	+	+	Melnick (1957)
A-10	+	+	Pohjanpelto (1955)

lytic cases. While this association appears highly suggestive, we must hesitate before concluding that certain types of Coxsackie viruses actually cause paralytic disease in human beings.

Five types of group B Coxsackie viruses have been isolated from stool specimens and all but 1 of them from samples of cerebrospinal fluid from cases of aseptic meningitis. Table 2 indicates in addition that 2 of these 5 types were recovered from fecal specimens obtained from paralyzed individuals.

In their final report on the evaluation of Red Cross gamma globulin as a prophylactic agent for the prevention of paralytic poliomyelitis, Hammon and associates,⁶ in 1954, listed a number of paralyzed children from whom they had been unable to obtain polioviruses. In April of this year, Hammon and associates⁷ spoke before the Society of American Bacteriologists at Detroit and indicated that Coxsackie viruses types B-3 and B-4 as well as ECHO viruses types 4 and 16 have been identified in stool specimens from 4 of the paralyzed youngsters who were studied during the gamma globulin field trials in Iowa and Texas.

Duncan and associates,⁸ in 1955, and McLeod and associates,⁹ in 1956, working in Toronto, Canada, made careful studies of the etiology of cases of aseptic meningitis which were not caused by one of the known types of polioviruses. Using monkey kidney cell tissue cultures, they isolated Coxsackie virus type B-2 from the stools of 5 patients and from the spinal

fluid of 1 patient with aseptic meningitis. Similarly, they encountered Coxsackie virus type B-4 in the stools of 9 children and in the spinal fluid of 2. Clinically, their cases showed fever, nausea, vomiting, headache, and drowsiness. It is their impression that about 20 per cent of the cases of aseptic meningitis seen in Ontario are caused by members of the B group of Coxsackie viruses.

A report by Johnsson,¹⁰ in 1956, on the situation in Stockholm, Sweden, indicates relationships between Coxsackie viruses types A-6, A-7, and B-4 and aseptic meningitis as well as nonparalytic poliomyelitis. In 1953, Coxsackie viruses were isolated from 1 per cent and, in 1954, from 9 per cent of Swedish children showing symptoms of aseptic meningitis.

An unusually interesting case occurred at Macon, Georgia, during the summer of 1956. E.J.B., a little girl aged 4, had received Salk vaccine on November 5, 1955, December 2, 1955, and July 3, 1956. Twenty-three days after her third, or booster inoculation, febrile illness developed which was accompanied by paralysis of the quadriceps and anterior tibial muscles of her right leg. Her attending physician did a lumbar puncture and found a pleocytosis and other changes compatible with a diagnosis of poliomyelitis. He sent a stool specimen for virus isolation to the Virus and Rickettsial Diseases Laboratory of the United States Public Health Service at Montgomery, Alabama. It yielded Cox-

TABLE 2
ISOLATIONS OF GROUP B COXSACKIE VIRUSES FROM CASES
OF ASEPTIC MENINGITIS AND "PARALYTIC POLIOMYELITIS"

Virus type	Isolations from		Reported by
	Feces from paralytic cases	Cerebrospinal fluid	
B-1	+		Melnick et al. (1949) McLeod et al. (1956)
B-2	+	+	McLeod et al. (1956) Melnick (1957)
B-3	+	+	Hammon et al. (in press) Melnick (1957)
B-4	+	+	Davis & Mel- nick (1956) Johnsson (1956) McLeod et al. (1956) Hammon et al. (unpublished)
B-5	+	+	Furcolow (unpublished)

sackie virus type B-4 but no poliovirus. In September, when this child was admitted for treatment at Georgia Warm Springs Foundation, she had rather extensive paralysis of her right leg involving the abductors of the hip, quadriceps, anterior tibial, posterior tibial, and toe extensor muscles. To summarize, this was a clear case of paralysis in a child who had received 3 properly spaced injections of Salk vaccine well before the onset of her illness. The only virus isolated from her stool was Cocksackie virus type B-4.

During the summer of 1956, strains of Cocksackie virus type B-5 were isolated from an extensive outbreak involving hundreds of cases of aseptic meningitis which occurred in the Mason City area of northern Iowa.

Another clinical entity also related to infections with the B group of Cocksackie viruses has been observed recently in Holland, the United States, and South Africa. In 1956, Van Creveld and de Jager¹¹ described 4 fatal cases of an encephalo-hepato-myocarditis in newborn infants. Cocksackie virus type B-4 was isolated from the heart muscles of all 4 of the fatal cases and from the brain of 1 of them. Lesions in the myocardium were the principal pathologic findings. The mothers of 3 of these children had had symptoms of "grippe" at about the time each infant was born. Virus isolations were made by Verlinde and associates¹² in 1956.

As indicated in table 3, Cocksackie viruses were recovered in this country by Kibrick and Benirschke,¹³ in 1956, from the myocardium of 1 patient and from the thoracic spinal cord of another. Just prior to the birth of the latter infant, the mother had had an upper respiratory infection characterized by coryza, sneezing, and malaise. Both myocarditis and meningo-encephalitis were found at autopsy. The agent isolated was Cocksackie virus type B-3.

TABLE 3
COXSACKIE VIRUS ISOLATIONS FROM CASES OF
ASEPTIC MYOCARDITIS AND MENINGO-ENCEPHALITIS
IN NEWBORN INFANTS

Isolations from				Country	Reported by
Virus type	Heart muscle	Feces	Spinal cord		
B-3		+		South Africa	Javett et al. (1956)
			+	U.S.A.	Kibrick and Benirschke (1956)
B-4	+		+	Holland	Van Creveld & de Jager (1956)
	+			U.S.A.	Kibrick and Benirschke (1956)

In 1956, Javett and associates¹⁴ gave an account of an epidemic of Bornholm disease which occurred in 1952 in Johannesburg, South Africa. Of 10 babies who fell ill while still at a maternity home or shortly after their discharge, 6 died. Postmortem examinations carried out on 3 of them indicated a patchy myocarditis and, in 1 infant, a focus of encephalitis. A strain of Cocksackie virus type B-3 was isolated from a fecal specimen of 1 of these infants. Not long thereafter, another strain of group B Cocksackie virus was obtained from the heart muscle of a newborn infant who died at the Transvaal Memorial Hospital.

Sabin,¹⁵ in 1956, and Ramos-Alvarez,¹⁶ in 1957, made studies of the possible role of viruses in the etiology of diarrheal diseases of early childhood. During the summer of 1955, rectal swabs were obtained from 56 children admitted to the Cincinnati General Hospital with diarrhea as their chief complaint. Among 24 viruses recovered, 3 were type 1 polioviruses; 7 were ECHO viruses; and 4 were Cocksackie viruses, 2 of them being type B-2, 1 type B-1, and the other type A-9. The ECHO viruses identified belonged to types 2, 8, 11, and 12.

During their visit to the United States early last year, Chumakov and Smorodintsev gave Doctor Habel, at the National Institutes of Health, a strain of virus which they considered to be a possible fourth type of poliovirus. This strain had been isolated from the feces of 2 paralytic patients seen in Karaganda in Asiatic Russia. Baby mice and infant cotton rats could be infected when this virus was injected intracerebrally. Monkeys sometimes became paralyzed when inoculated intramuscularly and showed characteristic pathologic changes in the anterior horn cells of their spinal cords. Careful studies carried out this year in this country by Horstmann and Manuelides¹⁷ and others have shown, however, that the Russian agent is really Cocksackie virus type A-7.

THE ECHO VIRUSES

As has been mentioned earlier, tissue culture technics have indicated that many different kinds of viruses inhabit the human intestinal tract. These include the 3 known types of polioviruses and at least 24 types of Cocksackie viruses, to which suckling mice are particularly susceptible. Other human enteric viral agents which do not belong to either of those groups have been referred to by several different terms.

The name "orphan viruses" was suggested by Melnick¹⁸ in 1954 for those new agents which he considered as viruses. The same year Ramos-

Alvarez and Sabin,¹⁹ who had isolated several other antigenically distinct types from healthy American children living in Cincinnati and Xenia, Ohio, referred to them as "human enteric viruses." As a result of the formation of a special committee²⁰ by the National Foundation for Infantile Paralysis in 1955, the name ECHO viruses was proposed, and 13 antigenically distinct types were designated as the prototype strains of the enteric cytopathogenic human orphan group of viruses.

The ECHO viruses share the following characteristics: (1) they are cytopathogenic for human and monkey kidney cells growing in tissue cultures; (2) they are not neutralized either by antisera for the 3 known types of polioviruses or by antisera for the Coxsackie viruses; (3) they cause no disease in baby mice; (4) they appear to be unrelated to herpes simplex, influenza, measles, varicella, mumps, and the adenoviruses; and (5) antibodies to the ECHO viruses are found in human gamma globulin. It was also stipulated that if and when any of the established types is identified as the etiologic agent of a clinically distinct disease, it should be removed from the ECHO group of viruses.

Six additional types of ECHO viruses have been recognized recently, 3 of which have been encountered on several occasions in cases of aseptic meningitis. It now appears that some, but not all, of the strains of ECHO viruses types 9 and 10 will infect suckling mice, and they appear, therefore, to be intermediate forms belonging somewhere between the Coxsackie and the ECHO viruses. For instance, the strains isolated in Belgium this year by Quersin-Thiry and associates,²¹ when adapted to growth in tissue culture fluids, do produce myositis in infant mice.

A very extensive epidemic of aseptic meningitis spread across Belgium, Denmark, England, Germany, the Netherlands, and Switzerland during the summer of 1956. It appeared to be highly contagious and many cases showed an exanthematous eruption. Fever, headache, photophobia, stiffness of the neck, and various meningeal symptoms with pleocytosis were also reported.

Hsiung and Melnick,²² in 1955, and Melnick,²³ in a report now in press, have noted differences in the morphology of the plaques formed by certain ECHO viruses when growing on a monolayer of rhesus kidney cells. They include in group A ECHO viruses those agents which produce small irregularly shaped plaques, while the group B ECHO viruses grow rapidly into large circular plaques resembling the plaques produced by the polioviruses themselves. Three of

the 4 types of ECHO viruses which have been recovered from the cerebrospinal fluid of patients with aseptic meningitis grow as small irregularly shaped plaques on rhesus cells. This same group of ECHO viruses, group A, will not form plaques on a monolayer of kidney cells derived from African red monkeys.

The geographic distribution of the ECHO viruses like that of the Coxsackie and polioviruses is world-wide. In the northern hemisphere, epidemics are common during July, August, September, and October.

During July 1955, for example, an extensive outbreak of an illness resembling nonparalytic poliomyelitis occurred at Marshalltown, Iowa. Symptoms observed included headache, stiff neck and back, myalgia, and fever lasting five or six days. An account of the epidemiologic features has been prepared by Lehan and associates,²⁴ and an etiologic study was carried out by Chin and associates.²⁵ The agent responsible for this epidemic appeared to be ECHO virus type 4.

In 1956, Sabin¹⁵ reported the presence of antibodies to ECHO viruses types 7 to 11 inclusive in sera from children bled in Cincinnati, Ohio, and Jamshedpur, India. He also found antibodies to ECHO viruses types 8, 9, 10, and 11 in sera from Mexico City. ECHO virus type 1, which was originally isolated from Cairo, Egypt, has been encountered many times at Clark Air Force Base in the Philippine Islands.

Ten of the 19 types of ECHO viruses recognized at the present time have been recovered from the stools of patients with aseptic meningitis. They are listed in table 4, which also indicates that 4 types of ECHO viruses have been isolated from cerebrospinal fluid and 3 from the feces of paralytic patients.

Of particular interest is ECHO virus type 6, which has been associated with outbreaks of aseptic meningitis in Massachusetts, Connecticut, New York State, Washington, D.C., and Sweden. Karzon and associates,²⁶ in 1956, and Winkelstein and associates,²⁷ in an article now in press, have given accounts of the Buffalo epidemic which reached a peak in July and August 1955. The highest rates of aseptic meningitis were observed among children 5 to 14 years of age who were living in suburban areas. Seven boys with fever, headache, and signs of meningeal irritation were admitted to the Buffalo Children's Hospital from the nearby village of Holland. Improvement was rapid, and all of them were discharged within three to ten days, the only residual findings being occasional muscular weakness.

TABLE 4
ECHO VIRUS ISOLATIONS FROM CASES OF ASEPTIC
MENINGITIS AND "PARALYTIC POLIOMYELITIS"

Virus type	Isolations from		Reported by
	Feces	Cerebrospinal fluid	
2	+		Melnick (1957) Kibrick et al. (1957)
3	+		Melnick (1957)
4	+	+	Chin et al. (in press) Hammon et al. (in press)
5	+	+	Melnick (1957) Davis and Melnick (1956) Karzon et al. (1956) Kibrick et al. (1957) Melnick (1957) Meyer et al. (1957) Svedmyr et al. (1956)
6	+	+	Svedmyr et al. (1956)
7	+		Svedmyr et al. (1956)
9	+	+	McLean and Melnick (1957) Quersin-Thiry et al. (1957) Svedmyr et al. (1956)
14	+	+	Kibrick et al. (1957) Melnick (1957)
16	+	+	Hammon et al. (in press) Kibrick et al. (1957)
17	+		Melnick (in press)

Specific antibodies to ECHO virus type 6 appeared on the fifth day of illness and were still present seven months later. ECHO virus type 6 was isolated from stool specimens of all 7 patients, from the throat of 4 of them, and from the stools of 2 household contacts. During this same outbreak, ECHO virus type 6 was obtained from the spinal fluid of 7 other patients living in small communities located in the same general region.

Eleven strains of ECHO virus type 6 isolated from the feces of patients with aseptic meningitis were identified from California, Florida, Massachusetts, and Washington, D.C., in 1955 by Meyer and associates.²⁸ This agent also appeared that year in epidemic form in Troy, New York. In Connecticut in 1956, Davis and Mel-

nick²⁹ isolated 22 strains of ECHO virus type 6, one of their strains being obtained from a patient who had a mixed polio-ECHO virus infection.

During the summer of 1954, ECHO virus type 6 was recovered three times from cases of aseptic meningitis in Rhode Island. An extensive epidemic, which occurred in Massachusetts, was studied by Kibrick and associates³⁰ in 1957. They isolated 40 strains of ECHO virus type 6 from fecal samples from patients with clinical diagnoses of poliomyelitis. Muscular weakness of minimal or moderate degree was recorded in 22 of those individuals. The peak months for virus isolations were August, September, and October. Other viruses encountered included ECHO viruses types 2 and 14 and several strains of Coxsackie and adenoviruses.

In a critical review of virus studies carried out at the University of Toronto in 1954, Rhodes³¹ concluded that a certain number of clinically typical cases of paralytic poliomyelitis were really infected with other viruses. He recovered ECHO viruses on 3 occasions from paralyzed individuals who did not excrete a poliovirus. In monkey kidney cultures, those strains produced cytopathogenic changes closely resembling those caused by the polioviruses. Among the many agents which can produce "poliomyelitis-like diseases" Rhodes listed the following: Coxsackie virus infections, ECHO virus infections, equine encephalomyelitis, herpes simplex, herpes zoster, leptospirosis, lymphocytic choriomeningitis, mumps, and the Guillain-Barré syndrome.

Careful virologic and serologic studies of cases of poliomyelitis and aseptic meningitis were carried out by Svedmyr and associates³² during the Swedish epidemics of 1953 and 1954. Whenever possible, samples of stool and serum were obtained from each patient shortly after onset of illness, and a second blood specimen was taken some two weeks later. Type 1 poliomyelitis predominated in the 1953 outbreak, and infections with all 3 types of polioviruses were encountered the following year. ECHO viruses were isolated from 36 per cent of the cases of aseptic meningitis studied in Stockholm during 1954. ECHO virus type 6 comprised more than two-thirds of them and, in addition, 1 strain of ECHO virus type 7 and 1 of ECHO virus type 9 were identified.

During 1956, the most common cause of aseptic meningitis in Europe appears to have been ECHO virus type 9. In Belgium, for example, Quersin-Thiry and associates²¹ isolated 190 strains of this virus from fecal samples, 29 from spinal fluid and 6 from throat swabs. Paired sera

showed rises in titer in the convalescent serum for both neutralizing and complement-fixing antibodies. The strains of virus isolated in Belgium grew readily in human amnion and in monkey kidney cells but poorly in HeLa cells.

SUMMARY

1. Two newly recognized groups of enteric viral agents, the Coxsackie viruses and the ECHO viruses, are demanding increasing attention throughout the world.

2. Twenty-four different types of Coxsackie viruses and 19 types of ECHO viruses are now recognized.

3. These agents are important in the differential diagnosis of poliomyelitis.

4. Infections with some of these viruses are asymptomatic, while others may produce syndromes, such as aseptic meningitis, herpangina, pleurodynia, and grippe.

5. Six types of Coxsackie viruses and 4 types of ECHO viruses have been recovered from the cerebrospinal fluid of patients with aseptic meningitis.

6. Recently, several of these agents have been isolated from the feces of paralyzed persons whose illness would previously have been diagnosed as paralytic poliomyelitis.

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Rehabilitation Comes of Age

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WHEN I RECEIVED AN INVITATION to address this meeting on "Rehabilitation Comes of Age," my first impulse was to reply that I'd be very happy to speak at the meeting but I'd prefer to speak on a different subject. It occurred to me that maybe it was I who had come of age and not rehabilitation, since usually the gray-beards are asked to speak on philosophical subjects such as the one proposed for me.

As I thought the matter over, I put the proposition in the form of a question: Has rehabilitation come of age? If I develop or defend the thesis that rehabilitation has come of age, how might I prove it? What evidence of full growth or maturity can be adduced to support this view? My experience with that which is called rehabilitation has been quite limited and has been confined almost exclusively to dealing with problems in heart disease. Oddly enough, when I began working on methods of improving the employment possibilities of cardiac patients in 1941, it never occurred to me that I was becoming involved in rehabilitation. And now I can say that I did not realize the full significance of this until I began to formulate my thoughts for this meeting.

I realize that it is customary, and usually desirable, to set forth a definition of a term before discussing it. I shall refrain, however, from using the familiar and, to me, somewhat hackneyed definition which has become the darling of many rehabilitation workers. I prefer to attempt to develop a point of view and allow my listeners to formulate their own definition.

A few case histories may be useful.

Case 1. M. M. is a 20-year-old girl who has rheumatic heart disease. She recently married, anticipating a happy life as wife and mother. Although her mitral and aortic valves had been damaged, she has never been in congestive heart failure and her cardiac reserve is as good as could be expected. But her family physician had warned her: "It's all right for you to marry, but remember — no housework. You must not do as much as empty an ashtray." It is not difficult to picture the devastating

effect of this advice. What does rehabilitation mean in a situation such as this?

Case 2. J. V. is a 69-year-old man who has worked all his life and, for the past fourteen years, has been a porter in a machine shop. After an episode which was diagnosed as a heart attack, he returned to his job for several months and had no difficulty. A reduction in the work force resulted in his discharge, the employer claiming that the heart attack had rendered him physically unfit. The trade union to which Mr. V. belongs protested this violation of seniority rights, since an employee with less seniority had been retained. The episode has transformed a cheerful, willing worker into a depressed, despondent man. Can he be rehabilitated and, if so, how?

Case 3. S. L. is a successful, energetic 45-year-old haberdashery salesman whose earnings averaged about \$150 a week. A coronary thrombosis resulted in nearly a year of limited activity. During this time, he lost his job and used up most of his savings. His 19-year-old daughter is an honor student just finishing her third year in college. Mr. L's family physician has advised him not to resume the kind of work he formerly did. How is he to be rehabilitated?

Case 4. H. C. is 22 years old. When he was 14, his parents were told by the school doctor that he could not participate in gym activities because he had a heart murmur. An overprotective attitude on the part of his mother fostered a sense of dependency and led the boy to expect special consideration in most activities. For several years, he has not applied himself with any diligence to anything. What can rehabilitation do in a case such as this?

These are but a few typical examples from among the hundreds of cases I have seen. It is at once apparent that, while each presents its own individual problems, a few basic principles apply to all, such as:

1. Rehabilitation has many facets.
2. Rehabilitation requires the application of many types of skills and knowledge.
3. The necessity for rehabilitation can often be avoided.
4. Rehabilitation should not necessarily be looked upon as an independent discipline.

The complexity of the present-day practice of medicine is too well-known to require detailed comment. While it is true that, in a sense, automation has already found a place in medicine — a place that will undoubtedly assume more importance — it is unlikely that the near future will see the physician and his ancillary cohorts replaced by Univac.

Let's go back for a moment to the case his-

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Presented at the annual meeting of the Ohio State Heart Association, Cincinnati, April 22, 1956.

tories previously cited. Who is involved in the rehabilitation of these patients? The list includes the physician, social worker, vocational counselor, employer, labor union, state labor mediation board, employment agency, and perhaps others. While several members of these groups may be required to participate in the rehabilitation of some of these patients, in every instance, the one indispensable factor is the physician.

I now come to the main point of my argument. Every disease entity known to medicine has a natural history, that is, the course it follows from inception until termination in either cure or death. The fundamental objective of the medical and allied professions is to prevent a disease process from starting and, failing this, to modify the natural history or course of the disease in every possible way that will be to the advantage of the patient. The possibility of cure or of a successful delaying action is enhanced by early and accurate diagnosis and by the availability of effective therapeutic media.

The various modalities of physical medicine and some of the other procedures which are commonly identified with rehabilitation are, in my opinion, no more important or valuable as rehabilitation tools than the diagnostic x-ray machine, insulin, or the surgeon's knife. All play a role in medicine's efforts to influence the course of disease to the advantage of the patient.

And now to go back to what may have seemed like a cryptic remark I made earlier: that not until I began formulating my thoughts for this address did I realize why, when I began working on the employment problems of cardiac patients, I did not see their relationship to rehabilitation. Possibly, the answer is as clear to you as it now is to me. It is simply that rehabilitation is not, and should not be considered, an independent discipline apart from the practice of what we choose to call good medicine. It is my belief that when, and only when, this point of view is adopted and followed will we be able to say truthfully "rehabilitation has come of age."

ATRIAL FIBRILLATION frequently occurs after mitral valvulotomy, particularly in elderly patients, in persons who have had paroxysmal fibrillation preoperatively, and in individuals with mitral insufficiency. Fibrillation usually begins during the first postoperative week, most often on the second day. The arrhythmia does not impair the results of valvulotomy.

Postoperative fibrillation is not related to fever, congestive failure, changes in serum electrolytes, or existence of rheumatic carditis as demonstrated by finding of Aschoff bodies in atrial biopsy specimens.

Arrhythmia is probably induced by the total physiologic response to operation rather than by immediate surgical trauma, production of traumatic pericarditis, or increase in left atrial pressure.

Full digitalization before mitral surgery is desirable to prevent tachycardia during fibrillation.

Quinidine therapy should be deferred until the seventh postoperative day, since sinus rhythm returns spontaneously in about one-fourth of patients before this time. In most of the remaining patients, small doses of quinidine are adequate for defibrillation.

RANDAL HEINZ, M.D., and HERBERT HULTGREN, M.D., Stanford University, San Francisco. Arch. Int. Med. 99:896-904, 1957.

John Silas Lundy, M.D.

By J. Arthur Myers, M.D.



FOR MANY YEARS John S. Lundy has made numerous and significant contributions to THE JOURNAL-LANCET. He became a member of the Editorial Board in May, 1951. No one prior to or since that time has made more or finer contributions in the eighty-eight years since this journal was first published. He planned and edited the entire special issue under the title of "The Problem of Pain," published in February 1952. This issue was so popular among readers that Doctor Lundy kindly consented to edit a regular section on pain. This was introduced in the November 1952 issue. This section has been composed of original articles, editorials, reports on current literature, and book reviews. The con-

tents of this section on pain were so valuable that since July 1953 it has appeared quarterly.

Dr. John Lundy has so endeared himself among the members of the Editorial Board and the publisher, as well as his hosts of acquaintances and friends everywhere, that it is most pleasing to receive the announcement of his election as first president of the Anesthesia Memorial Foundation in 1956.

All join in the Salute to Doctor Lundy published in the January-February 1957 issue of *Anesthesia and Analgesia—Current Researches*, the journal of the International Anesthesia Research Society, and reprinted as follows with permission of the editor, T. H. Sheldon:

John Silas Lundy, M.D., has been selected as the first president of the Anesthesia Memorial Foundation. This organization, dedicated to helping young men in anesthesiology and to building the specialty, obviously could make no better choice.

Dr. Lundy . . . amiable, always ready and effective . . . has always been found doing the hard work and providing top leadership in the big jobs and the tough jobs of his specialty, his profession and his community.

Born on July 6, 1894, in Inkster, North Dakota, he was graduated from the University of North Dakota in 1913 with the degree of bachelor of arts, and received his medical degree from Rush Medical College in 1920, then serving his internship at Harper Hospital in Detroit.

In the same year, he moved to Seattle for general practice and the practice of anesthesia,

recognizing the importance of professional anesthesia in a day when it was virtually a medical curiosity.

Dr. Lundy became head of the section on anesthesia of the Mayo Clinic in 1924, and served continuously in this position until 1952. Today, he is senior consultant of the section and professor of anesthesiology, Mayo Foundation for Medical Education and Research, Graduate School, University of Minnesota.

FOUNDER AND LEADER

Licensed to practice in six states, he holds Certificate Number Two in the American Board of Anesthesiology and helped to found this organization, which he served as president in 1942.

Dr. Lundy also helped to organize and reorganize the American Society of Anesthesiologists and to initiate its component societies,

which is the reason that Minnesota was the first component society.

He was president of the American Society in 1946, and the recipient of its Distinguished Service Award in 1948.

Dr. Lundy also arranged for and was secretary of the Section on Anesthesiology of the American Medical Association from 1941 through 1955, and chairman of the section in 1956. He has served for many years as chairman of the Committee on Blood and Blood Banks and the Committee on First Aid and Red Cross of the Minnesota State Medical Association.

He organized the Anesthetists' Travel Club in 1929. This club became the Academy of Anesthesiology in 1952, and Dr. Lundy serves as its secretary.

CLINICAL "FIRSTS"

In the clinical field, Dr. Lundy introduced Pentothal Sodium for clinical practice on June 18 of 1934, and was the first to use radioactive Pentothal. He was the first to add a CO₂ position on gas machines and designed and had built a four-control gas machine.

Dr. Lundy established the first blood bank in 1935, and the first post-anesthesia recovery room in 1942. He also established the Anatomy Department of the Mayo Clinic and Mayo Foundation in 1927 and supervised it until 1947.

He has written on the average of one paper every six weeks over a period of 32½ years; a textbook entitled, "Clinical Anesthesia"; and an almost endless number of book reviews, editorials and abstracts. He established ANESTHESIA ABSTRACTS, and has been editor of the Section on Pain of THE JOURNAL-LANCET since 1952.

Dr. Lundy has trained 250 physicians and 210 dentists . . . 90 fellows in the Mayo Foundation alone.

A member of Beta Theta Pi, Alpha Kappa Kappa and Sigma Xi, he belongs to anesthesia societies throughout the world, and is an honorary member of numerous organizations. He is an honorary fellow of the International College of Surgeons, was appointed consultant in anesthesiology to the Shriners Hospitals for Crippled

Children in 1953, and is consultant to the surgeon of the Fifth Army of the U.S.A.

During World War II, Dr. Lundy was national consultant in anesthesia for the wartime graduate medical meetings, civilian consultant to the surgeon general of the U. S. Army, and chairman of the first aid committee of the Olmsted County Red Cross, helping to train 2,700 adults in first aid.

BENEFITING MILLIONS

In spite of all these tasks, he also has taken time to serve in many community and fraternal activities. A Shriner since 1923, he is an honorary life member of Al Malaika Temple of Los Angeles and of the Legion of Honor of the Nile Temple. He has been a member of the American Legion since 1921, is a past president of the Rochester Board of Public Health and Welfare, and has served as a director or trustee of hospitals, library boards, and many other organizations.

His awards include honorary degrees from Hahnemann Medical College and the University of North Dakota and a citation from the U. S. War Department for his work in selection of anesthetists for commission and assignment to Army duty.

In addition to golf and horseback riding, Dr. Lundy's main hobby is travel and the organization of anesthesiological societies and services everywhere.

Early in 1956, he suggested a revolving loan fund for young men interested in training as anesthesiologists and, together with other leaders of the specialty, was instrumental in organizing the Anesthesia Memorial Foundation for the further development of his chosen specialty.

We salute Dr. Lundy as one of the great pioneers whose name will be remembered as long as our specialty endures. We salute him for his continuing unselfish vigor in carrying forward the advancement of his specialty today. We recommend him for the inspiration and support he provides to everyone interested in increasing the margin of safety and in alleviating the pain of patients everywhere. Millions have benefited by his achievements.

Pernicious Anemia

A Problem in Diagnosis

JOHN F. BRIGGS, M.D., and JAMES BELLOMO, M.D.
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PERNICIOUS ANEMIA is an easily diagnosed disease when the classical signs and symptoms are present and are supported by definitive hematologic changes. It is possible, however, that other neurologic diseases may be present in the patient with pernicious anemia, so that the pattern of the subacute combined degeneration is altered. Furthermore, inadequate treatment may mask the true hematologic picture.

CASE REPORT

Mr. A., a 60-year-old white, married male, was seen on July 31, 1956. He stated that he had been a stationary engineer for many years. In recent months, he found it difficult to carry on his work because of numbness and tingling in his hands and feet. This increased in severity until it was difficult for him to carry on the mechanical manipulations incidental to his work as an engineer. At this time, he noticed the distress in his feet had become worse and that his gait was unsteady.

The family history was noncontributory. Physical examination revealed a poorly-nourished white male 70½ in. tall, weighing 170 lb. He appeared acutely ill and apprehensive. His blood pressure was 150/100, pulse 76, and temperature 98.6° F. at 9:00 A.M. on July 31, 1956. The physical examination was negative, except for the following:

1. The pupils were fixed and did not react to light and accommodation. Reflexes in the lower extremities were greatly diminished, and there was impaired tactile sensation and a loss of vibratory sense.

2. The tongue was smooth and shiny.

Laboratory examinations were negative, except for the following: hemoglobin 12.8 gm. and red blood cell count 3,640,000. White-cell and differential counts were normal. The gastric analyses showed no free hydrochloric acid, the blood Wassermann was negative, and spinal fluid studies were negative. Examination of the peripheral blood smear suggested the possibility of pernicious anemia. A sternal bone marrow puncture was done, and the pathologist reported that, although he could not be secure in the diagnosis, the smears suggested pernicious anemia.

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In view of the physical findings, a diagnosis of central nervous system lues was tenable. On careful questioning, the patient revealed that in 1918 he had syphilis and was treated intensively both with neoarsphenamine and bismuth. He received excellent and adequate treatment. A second possibility arose to explain the patient's neurologic findings; namely, a subacute combined degeneration of the cord with a relatively normal blood picture. Since there was no definitive laboratory evidence to substantiate the diagnosis of syphilis and because the treatment was so thorough and the patient never had developed a positive Wassermann following his treatment, it was felt that lues did not contribute to the present acute illness.

A neurologic consultation suggested that subacute combined sclerosis was the more likely diagnosis. A cobalamine study was done, which revealed that the patient unquestionably suffered from pernicious anemia.

Requesting the patient brought to light that a few months before he had consulted us, he had purchased and taken vitamin tablets. He denied taking any medication that contained liver, iron, and the like. The proprietary compound contained minute doses of vitamin B₁₂. With this information, we felt that the hematologic picture probably resulted from the ingestion of vitamin B₁₂ in the vitamin capsule.

With the establishment of the diagnosis of pernicious anemia, the patient was treated with liver extract and made an excellent recovery. The neurologic symptoms disappeared, and he regained his strength. He has returned to work, and his blood picture is normal.

SUMMARY

A case is reported of an individual who had both syphilis and the neurologic manifestations of central nervous system syphilis, and in whom signs and symptoms of subacute combined degeneration of the cord also developed. The hematologic definition was not complete for the diagnosis of pernicious anemia. The cobalamine test established the diagnosis of pernicious anemia. The patient made a complete response to liver therapy.

CONCLUSION

The coexistence of multiple neurologic diseases is not uncommon, but a definitive etiologic diagnosis may be made by the use of proper laboratory methods.

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Gastro-Intestinal Obstruction, by MYER O. CANTOR and ROLAND P. REYNOLDS, 1957. Baltimore: Williams & Wilkins Co., 565 pages, 415 illustrations. \$18.00.

This monograph constitutes a useful addition to the literature of bowel obstruction. There are 29 chapters in the book. It is well illustrated. There is a brief chapter on obstruction of the esophagus and another on gastric obstructions. The remainder of the monograph concerns obstructions of the intestinal canal.

The treatment of the subject matter is a bit unconventional in that the discussion of subjects such as intussusception does not come under a special heading but is considered under captions of obstructions of the small intestine, as well as under obstructions of the colon and again in another segment of the book relating to the management of obstructions. This device makes it a little difficult for the authors to present a complete story of a given variety of obstruction, which may concern several segments of the intestinal canal. Because of the senior author's interest in the subject of intubation, this area has received special consideration in the monograph. Yet, the important work of Dr. Grafton Smith, now of the University of Missouri at Columbia, receives scant mention. The

BOOK REVIEWS

work of Perry et al., (*Surgery*, 39:5: 725-735, 1956) relating to the usefulness of pneumoperitoneum in the recognition of venous strangulating intestinal obstructions is not mentioned, nor is the important work of Scott on the blood loss factor in strangulating intestinal obstructions (*Proc. Soc. Exper. Biol. & Med.*, 29: 748-751, 1932).

A nice chapter on parenteral fluids in intestinal obstruction is contributed by Robert Berry of the Department of Surgery at Ann Arbor, Michigan. The chapter on Nursing Technique in the Management of the Obstructed Patient is informative and will be found helpful by hospital personnel who care for tubes and patients who must tolerate them.

The authors present no figures or data concerning their own experience with the management of the

bowel obstruction problem, a consideration which has long been standard practice in European medicine and a practice which is coming also to mark the appearance of serious efforts in this country too.

OWEN H. WANGENSTEEN, M.D.

Pneumoencephalography, by E. GRAEME ROBERTSON, M.D., 1957. Springfield, Illinois: Charles C Thomas, 470 pages. \$14.50.

This scholarly work represents somewhat of a summary of the author's experimental and clinical experience in pneumoencephalography for over twenty years. The experimental work consists of the development of a device to simulate the subarachnoid space of the spinal canal and the ventricular system of the brain and various experiments which were performed in an attempt to learn more about the mechanisms involved in performing pneumoencephalography.

A much greater portion of the text is concerned with clinical pneumoencephalography. Strict attention is given to the indications for and the technic of performing pneumoencephalography. Detailed instructions are given on how to fill and demonstrate roentgenographically the fluid-filled spaces of the skull and spine.

(Continued on page 34A)



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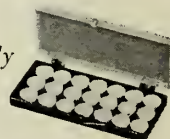
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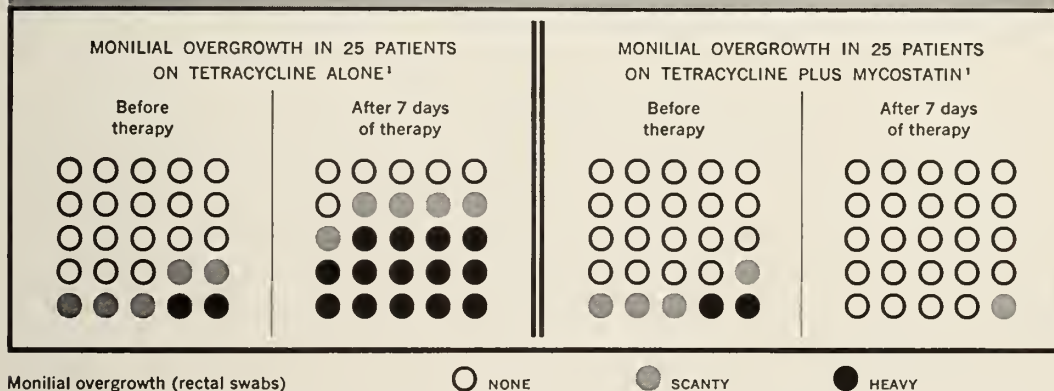
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1. Childs, A. J.: British M. J. 1:660 (March) 1956.

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BOOK REVIEWS

(Continued from page 32A)

Description, diagrams, and roentgenograms are utilized in presenting the findings of tumor and other diseases in pneumoencephalography. Most of the material presented has been published in previous works by the author and other workers to whom he refers.

A separate chapter is devoted to developmental abnormalities, which are not well covered in many publications of this sort. A complete description is given of the cavum veli interpositi, which consists of a recess passing forward from the cisterna venae magnae cerebri above the roof of the third ventricle. This recess was seen in 8 of a consecutive series of 500 cases and apparently is of no clinical significance. It seems that others have confused this recess with the cavum vergae. The spaces are quite separate. The cavum vergae lies above the fornix and the hippocampal fissure, and the cavum veli interpositi lies below it.

This monograph is heartily recommended to anyone interested in pneumoencephalography.

CHARLES M. NICE, JR., M.D.

Plastic Arterial Grafts, by W. STERLING EDWARDS, M.D., 1957. Springfield, Illinois: Charles C Thomas, 126 pages. \$4.50.

This short monograph on the use of plastic replacements for diseased or damaged arteries comes at an appropriate time. The author has developed what at present is probably the most widely used of the available plastic arterial substitutes—the Edwards-Tapp crimped nylon tube. That this does not represent the ideal arterial substitute, and that this publication is more in the manner of a progress report than a definite treatise on the subject is made clear in the text. However, the tremendous numbers of recent publications on the subject emphasize the desirability of this more comprehensive interim publication. Chapter 1 is a historic review of arterial grafting experiences. The most valuable part of the book, chapter 2, gives details of the preparation and use of the crimped nylon tube, developed by Dr. Edwards and Mr. Tapp, and effectually portrays another fruitful liaison between medicine and industry in the development of a useful biologic produce. Chapters 3, 4, 5, and 6 include short discussions of the etiology of various arterial lesions and their treatment with crimped nylon

tubes. It is unfortunate that these sections must be inconclusive concerning the relative merits of fresh homografts, freeze-dried homografts, and plastic arterial substitutes in these pathologic states. The latter have been used for too short a time to draw even tentative conclusions. Some of the unsolved problems in the field are discussed in chapter 7. This book should be of value to all those interested in this rapidly moving subject.

RICHARD H. EGDAHL, M.D.

Methodology of the Study of Ageing, edited by G. E. W. WOLSTENHOLME and CECELIA M. O'CONNOR, for the Ciba Foundation Colloquia on Ageing, 1957. Boston: Little, Brown & Co., 202 pages. \$6.50.

This is volume 3 of the Ciba Foundation Colloquia on Ageing and is edited by its director. Two earlier volumes are I. *General Aspects of Ageing* and II. *Ageing in Transient Tissues*.

The method of presentation is that of the brief essay followed by discussions. Twelve such are included, and the participants are 28 of the leading scientists in gerontologic research in various parts of the world. Names most familiar to American students are C. H. Best, E. Braun-Menendez, and G. W. Corner. For the physician and the industrialist, the 3 last discussions are of interest, that is, twin data on the genetics of ageing; problems in the study of changes in human performance with age; and the study of intelligence and emotion in ageing.

A. T. Weford says on page 158 that practical studies "are concerned with problems such as employment or social welfare to which the ageing process may be an important but nevertheless auxiliary consideration."

The little volume is discursive and expansive. It is pointed toward the research worker in gerontology.

S. MARX WHITE, M.D.

Manual of Radiation Therapy, by K. WILHELM STENSTROM, Ph.D.; collected by JOHN B. COLEMAN, M.D.; revised with additions and discussions by PAUL C. OLFELT, M.D., and FRANCES CONKLIN, M.D., 1957. Springfield, Illinois: Charles C Thomas, 94 pages, \$4.50.

This manual outlines the technics of radiation therapy developed by Dr. Stenstrom in his thirty years at the University of Minnesota. The initial section is devoted to brief discus-

sions of general principles of treatment, physical factors, basic methods, and the biologic effects of ionizing radiations. The importance of individualization of treatment and of careful follow-up is stressed.

The bulk of the book consists of a detailed description of the technics used by Dr. Stenstrom. The material is arranged chiefly according to the anatomic parts involved, with the exception of the lymphomas, which are considered separately. Indexing and organization are good, making reference to specific lesions and areas easy. Brief discussions of the relative merits of radiation as compared to other methods of therapy for each lesion are included, as well as the results obtained. Interstitial, intracavitary, and mold therapy with radium and radon are briefly considered, as are cobalt and isotope therapy, and the reasons for electing one type of treatment rather than another are clearly and concisely presented. Some complications of therapy are discussed.

This is not a general text on radiotherapy, and no attempt is made to include other methods or technics as used at different institutions or are the results compared with those obtained elsewhere. What the authors have done is to present an excellent, concise manual describing the methods developed by Dr. Stenstrom through his many years of experience. The book should be of great value to medical students, residents, and the practicing radiotherapist. In addition, it should serve a valuable purpose in acquainting physicians in other branches of medicine with technics of radiation therapy.

RICHARD GREENSPAN, M.D.

Practical Medical Mycology, by EDMUND L. KEENEY, M.D., F.A.C.P., 1955. Springfield, Illinois: Charles C Thomas, 145 pages. \$4.50.

The author has presented in a concise and comprehensive manner the salient data in relation to systemic and superficial fungus infections. The information is graphically outlined by the charts which precede the discussion of each disease. The inclusion of a chapter on nonedible poisonous fungi and a chapter on fungus spores as allergens round out the picture of mycotic disease in man. This compact monograph should be valuable to all those who are concerned with problems in medical mycology.

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